The Alberta Journal of Educational Research

Vol. XVIII, No. 2 *June, 1972*

CONTENTS

Some Determinants of School Achievement in Several Indian Groups 69
A. D. Bowd

Differences Between Applicants and Enrollees in a Mature Non-Matriculant Program 77
R. C. Conklin and J. Phelps

Programmed Instruction as a Tool to Facilitate Perception of Alternatives 82
V. K. Corfield

Variations in Perceptions of Organizational Climate 91
D. Friesen

Administrative Staffing Patterns in Ontario School Districts 100
E. S. Hickcox and D. J. Ducharme

Inequality and Rural Schools: Results of Surveys in 1967 and 1969 111
E. H. Humphreys

A Review of Selected Art Tests and Evaluative Instruments 124
R. N. MacGregor

Predicting the Demand for Teachers 133
D. M. Richards

Self Development in Adult Male Students in Relation to Success and Non-Success 140
A. G. Storey

FACULTY OF EDUCATION
The University of Alberta

EDITOR'S NOTES

In recent weeks many colleagues have paid tribute to Dr. H. T. Coutts on the occasion of his retirement as Dean of the Faculty of Education at The University of Alberta. His contributions to the field of education in general and to teacher education in particular have been widely recognized; although his contributions to educational research may have been mentioned less frequently, they are of equal significance. As a member of various University and Faculty committees, as Dean, and as a member of the Alberta Advisory Committee for Educational Research he devoted much of his time and energy to the promotion of educational research and the development of graduate study in education. Dean Coutts and his colleagues recognized that there was need for communication among researchers and for the dissemination of research results; this leadership and continued support have made possible the publication of AJER *over the past eighteen years. The Publications Committee and* AJER *staff join the many who have wished Dean Coutts well in whatever new career he chooses to pursue in his retirement.*

.....

We are pleased to announce that Dr. John McLeish, Professor of Educational Psychology, has accepted the editorship of AJER. *Although his duties commence July 1st officially, he has already been active over the past few months in making the necessary preparations for the September issue. Dr. McLeish came to The University of Alberta from Cambridge, England where he directed a five-year research project in the area of teacher education. He is the author of eight books (two at present in press) and a large number of research papers. His research interests range from musical ability in educationally subnormal children through students' attitudes to teaching methods, to superstitions of Canadian and British school children. Dr. McLeish has just completed a study of Alberta post-secondary, non-university students' motivations and needs. In addition to an impressive background of research and scholarship, Dr. McLeish also brings to the editorship two years of service as Chairman of the Faculty Publications Committee. It is evident that he is eminently qualified to assume his new responsibilities.*

.....

I wish to thank the many people with whom I have been associated, either through correspondence or personally, during my term of office for their cooperation, patience, and understanding. Special thanks are due to the contributors who reacted so kindly to our critical comments on manuscripts, to the subscribers who remained loyal and to those who responded to our campaigns, to the members of editorial committees for their expert advice, and to the members of the Publications Committee for their guidance. The fact that AJER *has been published at all during my term of office attests to the capable assistance of Mrs. K. Kinloch who served as secretary, to the patience of various members of The University of Alberta Printing Department, and to Mr. Alan Hellyer who has served as Assistant to the Editor for the past two years. As a result of their efforts a challenging task became a rewarding and enjoyable one for me.*

Erwin Miklos
Editor

The Alberta Journal of Educational Research *Vol. XVIII, No. 2, June, 1972*

A. D. BOWD

Some Determinants of School Achievement in Several Indian Groups[1]

This study examined the relative importance of vocabulary, general intelligence, language background and socioeconomic status in determining the grade level achieved by Indian boys aged 12-14 from several cultural groups in Western Canada. Accepting the distinction between present ability and educability for peoples undergoing acculturation, it was anticipated that while general intelligence would be a satisfactory predictor of achievement among white children, vocabulary and socioeconomic status would be most important for Indian groups. This expectation received general confirmation, and some implications for teachers of Indian children are discussed briefly. (Dr. Bowd is an Assistant Professor in the Department of Educational Psychology at The University of Manitoba.)

Studies of the educational achievement of Indian children, carried out for the most part in the United States, have consistently revealed grade retardation. Coombs et al. (1958) found the two best indicators of underachievement to be the degree of Indian ancestry and the child's pre-school language; they concluded, not surprisingly, that the more acculturated the child the better his chances of educational success. More recently the *National study of American Indian education* (Havighurst, 1970) pointed to economic disadvantage and social isolation from contemporary urban-industrial culture as the main causes of underachievement.

In this country, the *Survey of contemporary Indians of Canada* (Hawthorn, 1967) found that among three Indian communities of differing socioeconomic and cultural backgrounds in British Columbia, 80% of Indian children were retarded in grade one and that for all individuals examined the average age-grade retardation was 2.5 years. Despite cultural differences among the Indian communities, the almost universal socioeconomic disadvantage and associated limited verbal stimulation were claimed to limit drastically the success of Indian children at school.

[1] This study was supported financially by the Alberta Human Resources Research Council; the advice of Dr. P. E. Vernon is also gratefully acknowledged by the author.

In the sample examined by Hawthorn, only 28.5% of Indian workers were employed more than nine months of the year, while 61% were unemployed for more than six months of the year. In Canada for 1967, the Indian child at school was, on the average, retarded by two grade levels in comparison with the white population, and 27% of children dropped out of school by grade 8 (Indian Affairs Department, Education Division, 1969).

A concomitant of low socioeconomic status is limited verbal stimulation and feedback from adults in the formative years (Bernstein, 1961). Many Indian children suffer the further disadvantage of experiencing a conflict between their native language and that of the school. Bass and Burger (1967) suggest that language conflict may be the basis for the high failure and dropout rate of Indian children. Wax and Wax (1964) found that proficiency in English was essential for scholastic success among Indian children in the United States.

Several studies by MacArthur with Canadian Indian, Metis and Eskimo children have shown that certain "culture-reduced" tests of intelligence are useful predictors of educability among native people (MacArthur, 1968, 1969, 1970). Raven's Progressive Matrices test, in particular, was judged useful because it minimized the influence of specific information and skills while showing a substantial relationship with school achievement and other measures of intelligence (West and MacArthur, 1968).

Therefore, apart from cultural and motivational variables often specific to particular Indian groups, three pervading and quite general factors—socioeconomic status, language background and intelligence—have been consistently found to influence the educational achievement of Indian children. Even a cursory examination of the literature demonstrates that these same factors have been found to be of similar overall importance with respect to white children.

While these factors have at different times been related to Indians' educational achievement, there has been little comparative analysis of their relative importance in different groups. For example, it might be anticipated that verbal skills are more relevant to educational success in the elementary years, where so much learning is the result of verbal instruction, than the type of symbolic capacities assessed by Raven's Matrices. This may be particularly likely in so-called "culturally deprived" communities where language differences set the community apart from the larger society.

Problem

The principal expectation of the present study follows upon MacArthur's distinction between *present ability* and *educability* among Indian and Metis children (MacArthur, 1968). MacArthur points out that Raven's Matrices test, because it is less dependent upon extrinsic cultural and environmental variables, is a better predictor of potential achievement than traditional mental tests. It was anticipated that among white Canadian children this distinction would not obtain and that Raven's test would be a satisfactory predictor of present achievement or grade level. Among Indian and Metis students on the other hand, socioeconomic status and

vocabulary level are expected to be better indicators of present achievement. In particular, therefore, a high relationship between language background and grade level was anticipated in comparison with white children of a similar age.

The hypotheses which follow are based upon the assumption that when the influence of age is removed, educational achievement in the native groups will be determined primarily by verbal ability while in the white group general intelligence will be more important. The socioeconomic status of the family, judged in terms of paternal employment, is considered to be of greater consequence to the school performance of the native subjects because of its implications with regard to acculturation and the acceptence of Euro-Canadian values respecting work and education (Zentner, 1963). This distinction would not be expected to apply to the white subjects.

Use of English by Indian parents is considered an indication, to some extent, of their contact with white society and likely acceptance of white values regarding education. It is therefore likely to be of greater consequence regarding their children's overall school performance than is anticipated among white parents. For the same reason, the child's use of an Indian language is expected to relate negatively to grade level.

Hypotheses

That when the effects of age are removed:

1. Educational achievement in terms of grade level will correlate positively with Vocabulary and Paternal Employment in each native sample;
2. Grade level will correlate positively with Raven's Matrices in the white sample;
3. There will be no relationship between grade level and Vocabulary in the white sample;
4. There will be no relationship between grade level and Raven's Matrices in the native samples;
5. Parental use of English in the home will correlate positively with Vocabulary and grade level in the native groups;
6. The use of an Indian language by the child will correlate negatively with the grade level.

Design of the Study

Samples

The subjects selected were Indian and Metis boys aged between twelve and fourteen from four cultural groups in Western Canada, together with a sample of white boys of the same age from Calgary, Alberta.

All available boys in the age range were tested for each group except Calgary, and samples are considered representative of 12-14 year old boys for each community. The communities examined were chosen after consideration of the degree of white influence, so as to represent a considerable range of acculturation.

Bella Bella, British Columbia: 29 boys (mean age 12.7) ranging from grade 4 to grade 7 were tested. Situated 350 miles north of Vancouver

on a small coastal island, Bella Bella is relatively inaccessible and quite isolated from white influence. Fishing is the main industry, but unemployment is high for eight months of the year. Despite their geographical isolation the people of Bella Bella have all but lost their native language and little remains of their material culture.

Cluny, Alberta: 30 boys (mean age 13.1) from the Blackfoot Indian reserve. Cluny were tested. The grade range involved was 4 to 8. The Blackfoot reserve is situated about 65 miles east of Calgary on undulating short grass prairie country, the main surrounding industry being wheat and grain production. Unemployment is extreme, and despite their proximity to a major urban centre the Blackfoot language is the first language of nearly all children, many coming into initial contact with English at school.

Morley, Alberta: 36 boys from the Stony Indian reserve, Morley were tested. The mean age was 12.8 and the grade range involved was 4 to 7. Morley is situated 35 miles west of Calgary in the foothills of the Rocky mountains. There is some livestock raising and logging, but unemployment is very high and depressed living conditions are general. As at Cluny, the majority of children speak both English and the native language.

Lac la Biche, Alberta: 42 Metis boys attending public schools in Lac la Biche, 140 miles northeast of Edmonton, were tested. The mean age of the group was 13.2 years and boys from grade 4 to grade 8 were involved. In a sense this sample is transitional with respect to white acculturation, the Indian groups being more traditional. Although there tends to be more social contact with the white community, as with the Indian, unemployment and poverty are characteristic of Metis life. The Cree language is common among the Metis, but English tends to predominate.

Calgary, Alberta: 35 white boys attending a Calgary junior high school were tested. The grade levels involved were 7 and 8, the mean age being 12.9. The boys chosen came from a blue-collar neighborhood and may reasonably be assumed representative of white Canadian boys from a slightly lower than average socioeconomic level. It should be stressed that although socioeconomic differences were reduced somewhat bv the choice of a working class group, they still remain substantial. A large number of the children came from recently immigrated families, and did not have English as their first language.

Tests

The subjects were administered the Standard Progressive Matrices (Raven, 1938) and the Mill Hill Vocabulary Scale, Junior Set A. The assessment of paternal employment and language background was, for practical reasons, carried out in terms of questionnaire items administered to the boys.

Partial correlations between all relevant variables were computed, the effects of age being eliminated. Significance was determined by employing the t test for significance of a partial correlation coefficient (Ferguson, 1966).

Results

While the unemployment figures reported in Table 1 are considered reasonably accurate indications of conditions prevailing at the time of testing, it should be noted that the Bella Bella figure is seasonal and that unemployment is very much higher during the winter months. The large number of non-English speaking parents among the Calgary sample are recent immigrants to Canada.

TABLE 1

DATA FOR FIVE SAMPLES ON RAVEN'S MATRICES, PARENTAL EMPLOYMENT, VOCABULARY, USE OF INDIAN LANGUAGE BY CHILDREN AND ENGLISH BY PARENTS, AND GRADE LEVEL

Sample	Raven's Test		Paternal Employment	Vocabulary		Children's Indian	Parents' English	Grade	
	$\bar{X}$	SD	Percent	$\bar{X}$	SD	Percent	Percent	$\bar{X}$	SD
Calgary	38.29	9.91	89	17.17	3.12	—	69	7.26	.44
Lac la Biche	32.52	11.44	38	13.29	4.04	79	67	6.26	1.25
Cluny	34.53	7.78	27	9.53	4.59	90	23	6.37	1.30
Bella Bella	26.59	9.13	72	13.41	3.41	28	79	5.66	1.06
Morley	28.56	9.33	17	9.75	4.30	94	33	5.42	.83

The hypotheses concerning the correlates of grade level have received general confirmation in the data (Table 2).

Hypothesis 1, predicting a positive relationship with Vocabulary and Paternal Employment in each native sample, is confirmed in all cases for Vocabulary, and for two groups with regard to Paternal Employment. In the cases of Bella Bella and Morley correlations are positive but fail to achieve significance.

Grade level correlates highly with Raven's Matrices in the white sample, while failing to relate significantly with Vocabulary. Therefore hypotheses 2 and 3 are confirmed. However, the hypothesized independence of grade level and Raven's Matrices for the native samples, while accepted in three groups, is rejected for Lac la Biche.

As predicted then, grade level depends primarily upon general intelligence in the white sample, but upon verbal ability in the native samples. In the case of the Metis group, however, both these variables, together with paternal employment, are important correlates.

Hypothesis 5, that paternal use of English in the home will correlate positively with Vocabulary and grade level in the native groups, is confirmed for all groups except Morley where both coefficients are low and

non-significant (Table 3). The final hypothesis, that the use of an Indian language by the child will correlate negatively with grade level is rejected for all the groups studied.

TABLE 2

PARTIAL CORRELATION COEFFICIENTS (AGE ELIMINATED) FOR GRADE LEVEL, VOCABULARY, PARENTAL EMPLOYMENT AND RAVEN'S MATRICES TEST IN FIVE SAMPLES

Sample	Variable	Grade	Vocabulary	Paternal Employment
	Vocabulary	.228		
Calgary	Employment	.001	.204	
	Raven's Test	.476**	.303*	.281
	Vocabulary	.690**		
Lac la Biche	Employment	.455**	.485**	
	Raven's Test	.571**	.672**	.544**
	Vocabulary	.553**		
Cluny	Employment	.438*	.427*	
	Raven's Test	.235	.371*	.301
	Vocabulary	.648**		
Bella Bella	Employment	.318	.211	
	Raven's Test	.330	.069	.087
	Vocabulary	.775**		
Morley	Employment	.267	.376*	
	Raven's Test	.232	.349*	.421**

* significant at .05 level.
** significant at .01 level.

Discussion

The fact that Indian children tend to drop out of school more frequently and that they tend to be grade-retarded in comparison with white children is commonly attributed to the Indian child's background which is frequently described as "culturally deprived." The data presented in this study suggest that to some extent it is the school itself which determines that the Indian child will fail, that the criteria for success differ between white and Indian.

Irrespective of the diversity of cultural environment sampled, in all the native groups Vocabulary appears as the prime determinant of grade level. However, the Indian child has usually had less opportunity for the development of English language skills, and their use as a criterion for grade advancement penalizes him severely. Among the sample of white children studied, where many came from bilingual homes, it was general intelligence rather than verbal skills which determined grade level.

Clearly the language background of the Indian children studied is such that they have, on the average, developed poorer English vocabularies than the white children. The absence of significant correlations between

TABLE 3

PARTIAL CORRELATION COEFFICIENTS (AGE ELIMINATED) BETWEEN LANGUAGE BACKGROUND AND VOCABULARY AND GRADE LEVEL IN FOUR SAMPLES

Sample	Language	Vocabulary	Grade level
Lac la Biche	Parents' English	.344*	.273*
	Child's Indian	.142	.011
Cluny	Parents' English	.557**	.494**
	Child's Indian	-.131	-.243
Bella Bella	Parents' English	.638**	.345*
	Child's Indian	-.234	.084
Morley	Parents' English	.143	.034
	Child's Indian	-.195	.011

* significant at .05 level.
** significant at .01 level.

the child's use of an Indian language and grade level, together with the positive correlations with parental use of English suggests that inadequate exposure to English rather than the use of a native language is the principal reason for language problems at school.

The most apparent need of the Indian boys tested is for special training in the English language. It is not suggested that such training should be at the expense of the native language, but rather that intensive education in the use of English should be provided in the early years of elementary school, and that grade advancement should depend on skills other than verbal proficiency.

Vernon (1969) has noted that poor Indian performance in the "new math" may be attributed to the important verbal component inherent in its teaching. Many school subjects, particularly at the elementary level, are taught by verbal instruction and explanation, thus unfairly penalizing many Indian children. It is therefore suggested that more effective teaching strategies be adopted by teachers of Indian children. Kleinfeld (1970) for example, has suggested the use of Venn diagrams and other symbolic pictorial aids in teaching English language abstractions to Eskimo children. This principle might be extended to the teaching of other subjects, and generally more visually oriented techniques adopted.

References

Bass, W. P., & Burger, H. G. *American Indians and educational laboratories.* Albuquerque, N.M.: Southwest Cooperative Educational Laboratory, 1967. (ERIC: ED 014 369.)

Bernstein, B. Aspects of language and learning in the genesis of social process. *Journal of Child Psychology and Psychiatry,* 1961, *1,* 313-324.

Coombs, L. M., Kron, R. E. Collister, E. G., & Anderson, K. E. *The Indian child goes to school: a study of interracial differences.* Washington, D.C.: U.S. Department of the Interior, Bureau of Indian Affairs, 1958.

Education Branch, Social Services, Department of Indian Affairs and Northern Development. *A brief study of available statistical data on Indian pupil enrolment 1949-1969.* Ottawa: Queen's Printer, 1969.

Ferguson, G. A. *Statistical analysis in psychology and education.* New York: McGraw-Hill, 2nd Ed., 1966.

Havighurst, R. J. The education of Indian children and youth. *National study of American Indian education: Summary report and recommendations,* Series 4, no. 6, Washington, D.C.: U.S. Office of Education, Dec. 1970.

Hawthorn, H. B. (Ed.). *A survey of the contemporary Indians of Canada.* Two volumes. Ottawa: Indian Affairs Branch, 1967.

Kleinfeld, J. *Cognitive strengths of Eskimos and implications for education.* Fairbanks: Institute of Social, Economic and Government Research, University of Alaska. Occasional paper No. 3, 1970.

MacArthur, R. S. Some differential abilities of northern Canadian native youth. *International Journal of Psychology,* 1968, *3,* 43-51.

MacArthur, R. S. Some cognitive abilities of Eskimo, White and Indian-Metis pupils aged 9-12 years. *Canadian Journal of Behavioural Science,* 1969, *1,* 50-59.

MacArthur, R. S. Cognition and psychosocial influences for Eastern Eskimos and Nsenga Africans: Some preliminaries. Unpublished paper presented at the Symposium on Cross-Cultural Research. The Institute for Human Relations, St. John's, Newfoundland, 1970.

Vernon, P. E. *Intelligence and cultural environment.* London: Methuer, 1969.

Wax, R. H., & Wax, M. L. *Dropout of American Indians at the secondary level.* Cooperative Research Project No. S-099. Atlanta: Emory University, 1964. (ERIC: ED 003 853.)

West, L. W., & MacArthur, R. S. An evaluation of selected intelligence tests for two samples of Metis and Indian children. *Alberta Journal of Educational Research,* 1964, *10,* 17-27.

Zentner, H. Factors in the social pathology of a North American Indian society. *Anthropologica,* 1963, *5,* 119-130.

The Alberta Journal of Educational Research *Vol. XVIII, No. 2, June, 1972*

R. C. CONKLIN
and
J. PHELPS

Differences Between Applicants and Enrollees in a Mature Non-Matriculant Program[1]

Differences between applicants and those students who completed courses in a Mature Non-Matriculant (MNM) Program were examined at The University of Calgary. Six hundred and fifty-eight MNM applicants were divided into two groups: 337 who did not enrol and 321 who did enrol and were successful in three or more courses. The Cooperative Academic Ability Test (CAAT), and three subtests of the Iowa Tests of Educational Development (ITED) were administered to the subjects. Significant differences were found between the two groups on the CAAT as well as the ITED. In addition, applicants differed from enrollees on several relevant biographical variables. The results were interpreted as evidence of the need for well developed linguistic skills and personal "support" for successful MNM students. (Dr. Conklin is an Associate Professor of Educational Psychology at The University of Calgary; Mr. Phelps is a principal in the Brooks School Division, Brooks, Alberta.)

Problem

As evidenced by the increasing body of literature the dropout phenomenon has caused much concern among educators. In particular researchers have found a disturbingly high dropout rate for university students (Goetz & Leach, 1967; Iffert, 1958; Lindsay, Marks, & Hamel; and Summerskill, 1962). These researchers estimate attrition rates ranging from 50% to 67% over a normal four year college or university program. Most studies of this nature have been done using freshman college students and fewer studies have used mature adult students as subjects. Verner and Davis (1964) thoroughly reviewed the literature on adult dropouts and found that it was difficult to formulate valid conclusions from the research due to a lack of statistical verification in the majority of studies.

With an increasing emphasis on adult education at all levels the question of adult dropouts is also receiving increased attention (Mann,

[1] This research was supported, in part, by a grant from the Alberta Human Resources Research Council (Grant No. 69-4072).

1966; Sainty, 1968). It is estimated that in the United States alone there are probably 30 to 50 million adults participating in educational activities. It is not certain what attrition rate is evidenced in adult student populations, but it is generally accepted that these students have a greater financial and psychological investment in their education. Whatever the dropout rate may be the reasons for it are complex and interwoven and therefore remain inconclusive.

For several years at the University of Calgary adults who have not gained the normal entrance requirements have been allowed entrance under the Mature Non-Matriculant (MNM) privilege. Under this privilege students must be at least 23 years of age and demonstrate a desire for further education. The plan has been a success as is evidenced by the numbers of students enrolled: 1967-68, 280; 1968-69, 460; 1969-70, 700+ (est.). In the Faculty of Education, for instance, one student in six is a MNM. In addition, throughout all faculties it is estimated that less than 10% of the MNM's are actual dropouts and failures; an attrition rate much lower than the normal 20 to 40% attrition for freshman students.

One aspect of the entrance procedure for MNM students is the completion of a battery of tests supervised by Student Counseling Services. Previous to the summer of 1969 test records for approximately 700 persons were collected. The tests required one full day of the individual's time and arrangements to write them had to be made by the individual himself, usually after one or two interviews with an appropriate dean's office. Of the 700 who went through the above procedure and who were accepted for entrance only half actually enrolled in a course or courses at the university. Those who did not enrol could be described as pre-enrolment dropouts. The purpose of this investigation was to compare these applicants with those who were successful on the battery of tests administered during the entrance procedures.

Method

During 1969-70 the test data available on 699 applicants to the MNM program were analyzed. The test data included the following:

1. The Iowa Test of Educational Development (ITED)
   (a) Interpretation—Natural Sciences
   (b) Interpretation—Social Sciences
   (c) Interpretation—Literary Materials
2. The Cooperative Academic Ability Test (CAAT)
3. The Student Biographical Inventory

Of the three instruments the Student Biographical Inventory is the only nonstandardized one. It was constructed specifically to collect biographical information about MNM applicants. It is divided into seven sections which question the applicant on areas of work and social experience, educational experience, present plans and family data, personal characteristics, reading habits, additional applicant comments, and basic biographical data.

The total size of the sample was 699. These were further divided into three groups; (a) 337 applicants, (b) 321 successful enrollees, and (c) 41 persons who withdrew from their studies. This latter group may constitute

some failures and dropouts, but largely they are persons who take one year free from study and continue in a subsequent year. Because their status is not clear they were not included in the analysis for this report. Our sample then includes 658 MNM students—363 males and 295 females—ranging in age from 23 to 60. The 658 were then divided into the two groups mentioned above; 337 applicants and 321 enrollees. Scores on the ITED and CAAT were compared by testing the significance of the difference with a *t* test. In the case of biographical data the significance of the differences in percentage were compared.

Results

The results of the analyses for the ITED and CAAT tests appear in Table 1. The successful MNM students scored higher on the Verbal section of the CAAT, the total score of the CAAT, and on all three of the ITED tests. The only scale on which the successful students did not score higher was the Mathematical section of the CAAT.

TABLE 1

COMPARISON OF COMPLETIONS AND PRE-ENROLMENT DROP OUTS ON CAAT AND ITED

Variable	Pre-enrolment Drop outs Mean	S.D.	Completions Mean	S.D.	*t* Value	Significance
CAAT						
Verbal	29.07	8.38	32.40	8.31	5.11	$p < .001$
Mathematical	26.59	7.71	27.03	13.85	0.50	N.S.
Total	55.69	13.85	59.56	14.20	3.54	$p < .001$
ITED						
Social Sciences	50.72	14.68	56.25	13.39	4.87	$p < .001$
Natural Sciences	42.81	13.77	46.12	14.20	3.03	$p < .01$
Literary Materials	49.31	14.62	54.87	14.03	5.00	$p < .001$

Of the many biographical items, the following were the ones which differentiated significantly ($p < .001$) between the two groups of students.

1. Formal education beyond grade 12
2. Discontinuation of formal education because of low grades
3. Influence of friends and relations in selecting a particular field of study
4. Constant association with university people
5. Spouse with some university training
6. Spouse with professional type of occupation
7. Very supportive reaction by spouse regarding entrance to university.

Results of these items were positive indicators for the successful MNM. For example, they were more likely to have had education beyond grade 12 and were less likely to have discontinued high school because of poor grades. They were more influenced by friends and relatives and had more association with university people. Their spouses were more likely to have

had some university training as well as a professional type of occupation, and were more supportive to the university venture.

Discussion and Implications

It is interesting to speculate on the importance of linguistic ability as a differentiating variable with MNM students. It should be noted that the Natural Science and Social Studies subtests of the ITED are based on verbal ability. In an earlier examination of the problem it was found that the linguistic skills of the MNM students were relatively well developed as was evidenced by the fact that their scores on the linguistic test of the CAAT were approximately equal with full matriculated freshman students (Conklin, 1969). However, the same study revealed that their mathematical ability scores were much lower. It is a fact that a verbal facility has always been a necessity in most university programs and it is no surprise that about 76% of the MNM students enrol in the Faculties of Education and Arts and Science, both highly dependent on adequate verbal skills.

The fact that applicants who did not enrol scored lower on all tests measuring the linguistic factor may well mean that a self-selection procedure of a sort was in operation; that is, a MNM student who felt he did poorly on the tests may have decided to terminate his efforts at university. The reasoning may have been based on the presupposition that the tests, in fact, were representative of university work. On the other hand, those who had less difficulty with the tests may have been buoyed by the thought that their performance on the tests could be generalized to actual course work.

At any rate there is no doubt that MNM students with better developed linguistic skills are more likely to pursue university courses and be successful. Those with less well developed linguistic skills are more likely to be early dropouts.

The biographical data seem to indicate that MNM students who pursued high school to near completion or completion are better prospects for university at some future time. If they dropped out of a high school pattern it was not because poor grades were the greatest contributing factor. The remaining five items could be framed into a "support" hypothesis. It seems that the MNM requires a great deal of encouragement and support. Those who benefit from the support of friends, family, and relatives are more likely to be successful students. Peavy (1968), in a study of mental health problems of students, found that older students suffered mentally more often if they did not receive full support for their educational undertaking from their spouses.

As a result of the findings in the present study it seems reasonable to suggest that verbal ability tests (including reading tests) be used as screening devices for entering adult students. Where possible remedial reading programs and other methods of upgrading verbal skills should be offered as non-credit prerequisite courses to a university or college program. When a student achieved a certain level of competency he could then be admitted into a degree program thus eliminating the waste in human resources of the consequences of dropping out.

In addition to the above kinds of programs, colleges and universities should also offer "orientation programs" for the purpose of desensitizing and familiarizing the MNM applicant to the university milieu. Group counseling and discussion sessions could be held prior to enrolment. These could involve the spouse to ensure the possibility that inhibiting attitudes could be changed.

Although adult students are usually more "mature" and have adequate vocational goals already established, we, as educators, should not fall into the trap of thinking they do not need constant support and encouragement. They may need far more than their freshman counterparts.

References

Conklin, R. C. Facts and figures concerning mature non-matriculant students at the University of Calgary. *Student Counseling Research Bulletin,* 1969, *3.*

Goetz, W., & Leach, D. The disappearing student. *Personnel and Guidance Journal,* 1967, *45,* 883-887.

Iffert, R. E. Retention and withdrawal of college students. *U.S. Department of Health, Education, and Welfare Bulletin,* 1958, No. 1.

Lindsay, C. A., Marks, E., & Hamel, L. S. Native and transfer baccalaureate students. *Journal of College Student Personnel,* 1966, *7,* 5-13.

Mann, W. E. Adult drop-outs. *Continuous Learning,* 1966, *5,* 55-65; 127-143.

Peavy, R. V. Mental health crises of university students. *Canada's Mental Health,* 1968, *16,* 15-17.

Sainty, G. E. Some predictors of success in a course for academic upgrading of adults at a Canadian Vocational Training Centre. Unpublished master's thesis, University of Calgary, 1968.

Summerskill, J. Drop-outs from college. In N. Sanford (Ed.), *The American College.* New York: Wiley, 1962, 627-657.

Verner, C., & Davis, G. S. Junior completions and drop-outs: A review of research. *Adult Education,* 1964, *14,* 157-175.

The Alberta Journal of Educational Research *Vol. XVIII, No. 2, June, 1972*

V. K. CORFIELD

Programmed Instruction as a Tool to Facilitate Perception of Alternatives[1]

A program was devised for a teaching machine in an attempt to increase the ability of subjects to perceive alternatives in their environment. Stage I of the program utilized geometric figures varying in color, size, shape, and direction. Subjects were asked to group each array of six according to a common attribute and to specify as many such groupings as possible. Results indicated a significant increase in scores on an object sorting test for subjects who experienced the program; no such increase was evidenced by control subjects. In Stage II verbal statements were presented and subjects asked to list as many alternative meanings which could be attributed to the statement as possible. A significant increase in the number of alternatives perceived was evidenced on post-testing by subjects exposed to the program as compared to control subjects. (Dr. Corfield is an Associate Professor in the Department of Psychology at The University of Calgary.)

Haygood and Bourne (1965) have argued that the development of rules to guide one's behavior is preceded by the identification of attributes relevant to the evolving rule. In short, one attends to a variety of information before developing a concept or label. Other researchers have studied the process by which one obtains the requisite information. Many investigators have been particularly interested in the characteristically stable way in which a person functions over a range of situations. These consistent tendencies have been variously referred to as "rigidity," "dogmatism," "internal-external control," "field-dependence," and "conceptual structure."

Brown (1953) found that in an ego-involving situation, high scorers on the F scale were more likely to display rigid patterns of behavior which in turn interfered with their ability to solve complex problems. Rokeach (1960) differentiated people on the basis of the dogmatism of their beliefs. Rotter (1954) proposed that individuals develop expectancies that reinforcements are the result of their own actions (internal control) or are due to some external agent over which they have little control.

[1] This project was supported by a grant from the Alberta Human Resources Research Council.

Witkin (1965) reported that people showed consistent ways of functioning in their perceptual and intellectual activities. Field dependent individuals tended to be influenced by the field as perceived by them, whereas field independent individuals were able to make judgments independently of the field.

According to Harvey, Hunt, and Schroder (1961), and Schroder, Driver, and Streufert (1967), cognitive structure determines the kind and diversity of information an individual is capable of generating about his environment and the number of different ways he can organize and integrate that information. The contention is that informational input, evaluation of information, and reactions to that information are dependent on the cognitive structure of the individual.

These authors have proposed that people can be categorized as functioning at four levels of conceptual complexity. Persons functioning at the lowest level, designated as concrete, tend to lack organizational rules for establishing relationships among dimensions. As a result, thinking is categorical and is not open to conflicting information especially under conditions of conflict. Some of the available information may be excluded and external anchors are relied upon for guidance. At the highest level of complexity, abstract functioning permits integration of dimensions. Such persons base judgments on internal standards, which are constantly under revision as new information is experienced.

It is possible that those persons who are functioning at a concrete level may experience difficulty functioning adequately in social situations because of their inability to perceive alternatives. Not only may they categorically perceive the responses of others, but they may have a limited range of responses available for their use. Thus social interaction would likely be limited in effectiveness. Furthermore, dependence on external standards would make them vulnerable to control by others.

The present study was undertaken in the belief that perception of alternatives can be taught. Programmed instruction has been used to teach a wide variety of academic subjects and also to help those requiring special education. To date little work has been done with respect to programmed instruction in the field of social learning. Cohoon (1967) developed a program relative to applying for a job which was found to be a useful aid in counselling. Cogswell and Estavan (1965) have devised a program which performs some of the functions of a school counsellor. Programmed instruction in the area of social learning has received little attention.

The purpose of this project was to devise a program for a teaching machine which would increase the ability of subjects to perceive alternatives in their environment and to facilitate the integration of dimensions. As a first step in this process the task chosen was a concept formation task. It was hypothesized that the number and diversity of concepts attained after exposure to the program would increase significantly compared to the number achieved by those who did not have the opportunity for this learning experience.

A second stage involved the presentation of verbal statements to which subjects were asked to list as many interpretations as possible. It was

hypothesized that the number of alternative meanings attributed to a statement would increase significantly after exposure to the program but that such an increase would not be evidenced by those who did not experience the program.

STAGE I

Method

Subjects

Since a heterogeneous group of subjects was considered desirable for testing, visitors to the University of Calgary Open House were asked to participate. Fourteen female and fourteen male subjects took part. Seven subjects of each sex were randomly assigned to the experimental and control groups. Ages ranged from 11 to 21 years with an average age of 15.5 years. School grade ranged from Grade 6 to first year university, the median grade being Grade 10.

Materials

A program for the MTA 100 Scholar (Modern Teaching Associates) was prepared. The program consisted of a series of 18, 35 mm color slides. Each slide presented a 2 x 3 array of geometric forms in a variety of sizes, shapes and colors. Early in the series the array was composed of figures of approximately equal size but in two or three colors. The task of subjects was to arrange the figures into two groups of three figures each on the basis of a common attribute. For example, an array might be grouped: red circle, red square, red triangle/blue circle, blue square, blue triangle. These two groups would be based upon common color. The same figures could also be exhaustively grouped on the basis of shape, but in this instance three groupings would be required.

As the series progressed, each of the groupings contained geometric figures of three different sizes, three different colors and a variety of rotations in space. Arrays were arranged so that a number of correct answers were possible. For example, the final array could be partitioned on the basis of color, direction, size and shape.

A printed program was prepared to accompany the slides. The program directed the subject to exhaustively group the figures in the array into two groups of three figures or, on some trials, into three groups of two figures. Following each grouping the subject could obtain from the program a designation of the attribute (size, color, shape or direction) which could have been the basis of the grouping. The subject was urged to find as many groupings as possible in the array.

Synchronization features of the MTA 100 Scholar permitted automatic presentation of the slides on a Kodak Carousel 700 projector onto a rear view micrascreen. The program included one linear branch. No attempt was made to control step size.

To summarize, each subject was required to identify or discover the relevant attributes in the array, and to group the figures in the array on that basis.

The Goldstein-Scheerer Object Sorting Test (Goldstein & Scheerer, 1941)

was used for pre- and post-testing. The test consists of a selection of everyday objects (spoon, cigar, candle, plate, apple, nails, etc.). Among the objects there exist communalities of utility, material, color, form, size, texture, shape, and weight. Each subject was asked to examine the objects as they were spread before him and to group them on the basis of similarities or differences. The test score was the number of attributes used to group the objects.

Procedure

The experimental condition required subjects to do the Object Sorting Test, then work through the program, and finally to do the Object Sorting Test a second time. Pre-testing was conducted immediately prior to experience with the program and post-testing immediately following. Control group subjects did the pre- and post-test but spent about 30 minutes between the two looking at other displays in the building instead of working through the program.

Results

The results of t tests on pre- to post-test scores for the experimental and control groups are presented in Table 1. A significant increase from the pre-test score to the post-test score occurred for the group exposed to the program but not for the control group.

TABLE 1

MEANS, STANDARD DEVIATIONS, AND t TESTS FOR PRE- AND POST-TEST SCORES ON OBJECT SORTING TEST

Measure	Conditions			
	Experimental		Control	
	Mean	S.D.	Mean	S.D.
Pre-Test	3.429	1.555	3.857	1.231
Post-Test	5.000	1.414	4.714	1.589
t	2.695*		1.537	

* $p < .02$ two-tailed test

While some increase on post-test scores was evidenced in the control group as a result of test sensitivity, the amount of change was not sufficient to account for the differences found in the experimental condition.

Additional analyses were performed to investigate the relationship between scores obtained and other variables. Sex differences on the Object Sorting pre-test were studied by grouping males and females across the experimental and control conditions. The resultant t = 0.778 was not significant. The correlation coefficients between age and pre-test scores, and school grade and pre-test scores were 0.30 and 0.16 respectively. Both are below acceptable levels of significance.

Analysis of Slide Effectiveness

An additional 14 subjects worked with the program. The program used 18 slides and had a potential 27 responses since some of the arrays could be grouped on the basis of more than one attribute. The answer sheets of all subjects who experienced the program were scored and each of the 27 responses item analyzed. Each subject's response to each item was categorized true, false, or omitted. The point biserial correlation indicated the extent to which each item was grouped correctly with respect to the success each subject had with the program. In this way it was possible to reject four slides which appeared to lack discriminatory power. The length of the program could thus be reduced by about 22 percent without reducing effectiveness.

Discussion

The results obtained from testing the program indicated that people can be influenced in terms of their mode of information-seeking or attending.

Those persons who experienced the program had a higher probability of increasing their pre- to post-test score. The program had its intended effect without confounding effects of test sensitivity, age, school grade, or sex of the subject.

STAGE II

Method

Subjects

Visitors to the University of Calgary Open House were asked to participate in this experiment. Twenty males and twenty females were randomly assigned to the experimental and control groups with ten subjects of each sex in each group. Ages ranged from 13 to 27 years, with a mean age of 19.4 years.

Materials

As a first step in constructing a program, thirty brief statements were tape recorded and presented to 22 university students. Subjects were asked to list all the meanings which could be attributed to the statement. They were instructed not to list the different kinds of contexts in which the statement could occur, but rather to list the alternative meanings the speaker might have intended when the statement was made. Six statements from this original pool were selected for inclusion in the program. They included three male and three female voices. Statements were chosen on the basis of their ability to generate varied associations and responses on the part of subjects. Hence those with the highest mean response frequency were included, Examples of the kinds of statements used are, "It doesn't matter to him." and, "I know that."

A program for the MTA 100 Scholar (Modern Teaching Associates) was prepared. The six pre-tested statements were presented one at a time using a Cousino Synchro-Repeater which provides tape control of pacing. The printed program instructed subjects to respond to each verbal statement in terms of as many alternative meanings as possible. After each

presentation the program provided a list of acceptable interpretations. The subject was directed to proceed to the next statement and encouraged again to think of alternative meanings the statement might have. The program included one linear branch. No attempt was made to control step size.

Four additional statements were selected from the original pool for the purpose of pre- and post-testing. These four statements were further pre-tested using 87 university students to determine if they were similar with respect to their ability to generate responses, and to establish response frequencies. The two statements used for pre-testing had a combined mean of 3.29. The mean response frequency for the two statements used for post-testing was 3.04. One male and one female voice was used in each.

Procedure

Subjects were given the following instructions to read before responding to the two pre-test statements:

> PLEASE READ THROUGH THESE INSTRUCTIONS
> BEFORE BEGINNING
>
> First, you are to turn the recorder on and listen to the first statement carefully. Then turn the recorder to stop. You may hear the statement only once.
>
> On the sheet provided list *all* of the meanings which could be attributed to the first statement. Do *not* list different kinds of contexts in which the statement could occur. Rather, list the alternative meanings the speaker might have intended when he made the statement. Since you have no knowledge of the situation in which the statement was made, pretend you have overheard only the one remark. See how many meanings you can think of that the statement could have.
>
> Here is an illustration. The statement, "That was funny," could have the intended meaning that something was:
>
> 1. amusing
> 2. strange
> 3. inconsistent
>
> or indicate
>
> 4. sarcasm
> 5. wonder, questioning
> 6. disbelief
>
> and so on.
>
> After listing your alternatives, turn the recorder back on and listen to statement No. 2. Turn the recorder to stop, and list all of the different meanings which you think this statement could have. Again ignore the situational context in which the statement might occur. Focus your thinking on the possible alternative meanings the speaker could have intended to convey.

Subjects in the experimental condition completed the pre-test, then worked through the program prepared for the MTA 100 Scholar, and immediately after completed the post-test. Control subjects did the pre-test, spent about 20 minutes looking at other displays, and then completed the post-test statements.

Results

A t test analysis was carried out to test the significance of differences found. The results of this analysis are shown in Table 2. Differences on post-test scores between the experimental and control groups were highly significant (t = 3.556, df=38, $p <$ .001, 2 tail). No differences between groups existed on pre-test scores (t = 0.684, df=38). Pre- and Post-test difference scores also revealed a highly significant difference between the experimental and control groups. (t = 3.987, df = 38, $p <$ .001, 2 tail). These differences held for both male and female subjects. While female subjects increased their scores slightly more than males after exposure to the program the amount of difference was not significant.

TABLE 2

MEANS, STANDARD DEVIATIONS, AND t TESTS FOR POST-TEST SCORES AND DIFFERENCE SCORES FOR EXPERIMENTAL AND CONTROL GROUPS

		Conditions						
		Experimental			Control			
Measure	Ss	N	Mean	S.D.	N	Mean	S.D.	t
Post-test	All Ss	20	6.300	3.568	20	3.525	3.320	3.556***
Difference	Males	10	2.350	3.215	10	.150	1.375	2.145*
Score (Post-	Females	10	3.000	2.906	10	.800	1.975	3.244**
less Pre-test Score)	All Ss	20	2.675	3.001	20	.475	1.690	3.987***

* $p <$.05 two-tailed
** $p <$.01 two-tailed
*** $p <$.001 two-tailed

Not only was the amount of change greater in the experimental group as compared to the control, but also the number of subjects who showed improvement was significantly greater. A chi square test on the number of subjects in each group who showed improvement on the post-test as compared to the pre-test, and those who either showed no change or a lower score on post-testing was significant at the five percent level. The observed and expected frequencies are shown in Table 3.

Discussion

The results obtained from testing this program indicated that people can learn to perceive more alternatives in their social environment than they did before this kind of experience.

It could be argued that the program had the effect of establishing a set for viewing available cues. Provided the set is generalized to other situations, learning such a set would be a highly desirable outcome.

Whether or not the increased ability to perceive alternatives of subjects who experience such a program would be generalized to situations related to their day-to-day lives remains an open question. It is hoped that additional work to assess generalizability will be possible.

TABLE 3

CHI SQUARE TEST ON SUBJECTS SHOWING IMPROVEMENT AND NO IMPROVEMENT IN THE EXPERIMENTAL AND CONTROL GROUPS

Improvement	Conditions				Total
	Experimental		Control		
	Observed	Expected	Observed	Expected	
Improved	16	12.5	9	12.5	25
No improvement	4	7.5	11	7.5	15
Total	20	20	20	20	40

$X^2 = 5.226$, df = 1, $p < .05$

Since no information was available regarding the conceptual structure of those who participated, no conclusions can be drawn at this time regarding the ability of such a program to increase the information-seeking and integrative ability of persons functioning at a concrete level. Using a test of cognitive structure before and after experiencing the entire program, is a desirable next step in testing the basic hypothesis that individuals functioning at a concrete level of complexity can be taught to perceive alternatives in their environment.

This attempt to teach directly the perception of alternatives suggests that people can learn to seek more information in a situation and integrate it in a meaningful way. Thus persons who approach situations in a rigid or concrete fashion may be able to learn greater flexibility by becoming aware that many situations can be perceived in more than one way. The result of exposure to such a program may help such persons to realize that their own approach should be open to revision or, at least, may make the acquisition and integration of new information more likely. It is hoped that further work with programmed instruction will add needed additional evidence.

References

Brown, R. A determinant of the relationship between rigidity and authoritarianism. *Journal of Abnormal & Social Psychology,* 1953, *48,* 469-476.

Cogswell, J. F., & Estavan, D. P. *Explorations in computer-assisted counselling,* Santa Monica: SDC, 1965.

Cohoon, D. D. An experimental programmed adjunct to counselling: Applying for a job. *Journal of Clinical Psychology,* 1967, *23,* 62-67.

Goldstein, K., & Sheerer, M. Abstract and concrete behavior: An experimental study with special tests. *Psychological Monographs,* 1941, *53,* 239.

Harvey, O. J., Hunt, D. E., & Schroder, M. *Conceptual systems and personality organization.* New York: John Wiley & Sons, Inc., 1961.

Haygood, R. C., & Bourne, L. E. Attribute and rule learning aspects of conceptual behavior. Behavior research laboratory report No. 51, University of Colorado, 1965.

Rokeach, M. *The open and closed mind.* New York: Basic Books, 1960.

Rotter, J. B. *Social learning and clinical psychology.* Englewood Cliffs, N.J.: Prentice-Hall, 1954.

Schroder, H., Driver, M., & Streufer, S. *Human information processing.* Toronto: Holt, Rinehart & Winston, 1967.

Witkin, H. A. Psychological differentiation and forms of pathology. *Journal of Abnormal Psychology,* 1965, *70,* 317-336.

The Alberta Journal of Educational Research *Vol. XVIII, No. 2, June, 1972*

D. FRIESEN

Variations in Perceptions of Organizational Climate

Much has been written and spoken about open climate in public schools; however, almost all research to date has focused on the teacher level or higher. This study made an assessment of openness as viewed by administrators, teachers, and students. The perceptions of climate by the three groups were compared in two schools: one open campus school and one traditionally organized school. It was concluded that student perceptions of open climate do not necessarily follow from administrator or teacher perceptions of openness in school climate. (Dr. Friesen is a Professor of Educational Administration at The University of Alberta.)

New forms of school organization are receiving much attention these days. Particularly popular has been the concept of the "open climate" in high schools. Certain schools are pictured as models of innovation for their efforts at removing restrictions and rules from their organizations. Students in these schools are experiencing a new freedom to determine their own behavior in most activities related to their social life, and to develop new characteristics of social relationships with other members of the school organization. These schools are said to exhibit an open climate.

Miklos (1965) in reviewing theory and research described the climate of an organization as referring to the "characteristics of certain social relationships which exist among the members of an organization and between the total organization and its participants." Research in schools that resulted from the use of such a definition of climate, particularly that of Halpin and Croft (1963), Andrews (1965), and Stryde (1966), focused mainly on the participants at the teacher level and higher. The newer forms of school organization have extended the concept of climate to include students as well as teachers. Thus in recent years schools have been described as "open" if students have had considerable freedom in making choices (Friesen, 1970).

The writer recently directed a series of studies designed to examine the meaning and impact of the open climate on members of school organizations (Bevan, Marshall, Marsh, 1970). One area of the studies, focusing on the perception of organization members, was based on the assumption that if an "open" and a "closed" school were compared on this concept a significant difference in perception of climate at all levels of the organizational structure would be revealed. Not only the higher participants would perceive greater openness but also the lower participants. Lower participants included students and teachers, according to the classification advanced by Etzioni (1961).

The "open" and "closed" designations for schools were those obtained from a number of sources to describe the schools. The climate on which these schools were compared was based on the work of Halpin and Croft (1963) and obtained by the administration of their Organizational Climate Description Questionnaire (OCDQ). The OCDQ was used in its regular form with teachers, and in an adapted form with students (Marsh, 1970).

Rationale and Hypotheses

A school classified as "open" would exhibit a number of characteristics different from those of a school classified as "closed." It would be a lively organization with leadership behavior emanating from all levels. Social needs would be satisfied more frequently. Interactions would be more genuine and authentic, with spontaneity and freedom. If "openness" exists in the school it seems reasonable to assume that the authenticity of freer relationships would pervade the administration-pupil and the teacher-pupil interactions. Further, it seems reasonable to assume that the pupils in an "open" school would sense this openness just as other members of the organization, as well as those people outside the organization who attach the label of openness to the school.

The present study set out to test this last assumption: students, teachers, and administrators of a school classified as "open" will all perceive their school as having a more open climate than the students, teachers, and administrators of a school classified as "closed." In addition, it seemed a reasonable assumption that significant differences in OCDQ subtest scores would be obtained between the two-schools, and this at all levels of the school organization.

H. 1: Teachers in a school classified as "open" perceive a significantly more open climate in their school than those in a school classified as "closed."

H. 2: Significant differences in mean OCDQ subtest scores exist between teachers in a school classified as "closed."

H. 3: Students in a school classified as "open" will perceive a significantly more open climate in their school than those in a school classified as "closed."

H. 4: Significant differences in mean OCDQ (adapted) and subtest scores exist between students in a school classified as "open" and those in a school classified as "closed."

Methodology

Instrumentation

School Climate Questionnaire. The SCQ, developed by Bevan (1970), is a 14-item instrument designed to measure the degree of openness of a high school. It is completed by the administrators of a school. Responses to each item are scored on a four-point scale and scored from one (no students) to four (all students). The fourteen items deal with student activities of the following nature: leaving school premises during school hours without special permission, leaving school after the last class, using study periods at their own discretion, dressing as they like, attending classes on a voluntary basis, smoking in special rooms or on school grounds, and electing a school program of their own choice. The principal responds with the category which best describes his school's official policy in relation to student autonomy. The higher the overall score, the more open the principal sees his school.

The Organizational Climate Description Questionnaire. The OCDQ is an instrument containing 64 Likert-type items. Eight subtest have been isolated from the responses, as well as a score of openness of climate. Teachers are the respondents to this questionnaire. Numerous studies have provided support for the validity and reliability of the eight subtests of the OCDQ, however, the classification of schools into the six climates suggested by Halpin and Croft has not been supported well. Halpin and Croft (1963) are much more confident about the ranking at each end of the continuum which they suggest. This study makes use of the subtest scores and the openness scores only. The higher the score on the openness dimension the more open is the climate.

The openness score for this study was derived by means of the formula employed by Appleberry and Hoy (1969). The openness score "is found by summing the school's scores on the Esprit and Thrust subtests, then subtracting the school's score on the Disengagement subtest."

The OCDQ was adapted for student use in a pilot study. The items were revised to reflect not the teacher-principal interactions, but the student-teacher interaction. Factor analytic methods were employed to check the success of the transformation. Several items that failed to load on the factor predicted were further revised. This adapted version of the OCDQ was used in the study (Marsh, 1970).

In addition to the above two instruments, a rating scale on openness of climate was used with the principals, and with a panel of judges. The principals were also asked to rank their own schools from high through average to well below average on a seven-point scale. The panel of judges ranked the nine high schools in the study on the basis of openness.

The Sample

Nine high schools (grades 10-12) in a large urban system were included in the initial stages of the study. They represented all but two of the high schools in the city; the two that were not included were special schools. The principals completed the SCQ and the special ranking form.

After the schools had been ranked from high to low, on the basis of the principals' scores on the SCQ, the two with the highest rating on openness were declared "open," and those two with the lowest as "closed." One "open" school labeled School B in this report and one "closed" school labeled School A were targets for the research.

Thirty teachers selected at random from each school were asked to complete the OCDQ. Twenty-six from School A and twenty-seven from School B returned completed questionnaires. Six classes of students in grades ten and eleven were randomly selected from School A and seven classes from School B. As a result 180 completed student questionnaires were obtained from School A, and 183 from School B. The data for the sample are provided in Table 1.

TABLE 1

NUMBER OF COMPLETED TEACHER AND STUDENT QUESTIONNAIRES

Respondents	School A (Closed)	School B (Open)
Teachers	26	27
Students	180	183

Four steps were followed in the investigation:

(1) A panel of educators was canvassed to rank the nine schools on openness. The panel consisted of administrators and teachers who were not employed in the schools studied and professors.

(2) The principal of each school was asked to rate his school on the openness dimensions from high to well below average. Each principal also completed the SCQ.

(3) The teachers in the sample completed the OCDQ.

(4) The students in the sample completed the adapted version of the OCDQ.

Analysis of variance was used to test the hypotheses. An alpha level of .05 was considered as indicating a significant difference between groups.

Results

The panel of judges, the principals' scores on the SCQ, and the principals' ranking of the openness of their own schools all indicated that School A was toward the closed end of the climate continuum and School B toward the open end. The principals' scores are provided in Table 2.

In no case did a principal rank his school as below average on openness. However, in this ranking, the principals of the open schools ranked their schools high in openness, while those in closed schools ranked theirs as average.

Hypothesis 1 predicted that teachers in the two schools will differ in their perception of openness in climate. Table 3 provides a summary of the analysis.

TABLE 2

SCORES OF NINE URBAN HIGH SCHOOLS ON THE OPENNESS DIMENSION OF SCHOOL CLIMATE: PRINCIPALS' EVALUATION

School	Openness Dimension Score (minimum = 14, maximum = 56)	Designation
1	56	Open
2	47	
3	43	
4	42	
5	42	
6	39	
7	37	
8	30	
9	19	Closed

TABLE 3

ANALYSIS OF VARIANCE OF THE DEGREE OF OPENNESS PERCEIVED BY THE TEACHERS

Group	N	Mean
School A	26	0.88
School B	27	1.64
$F = 7.85$	$p = .007$	

The hypothesis was supported. The school classified as open by administrators and outsiders was considered open by teachers, as well.

Hypothesis 2 predicted significant differences between the teachers of the two schools on the eight subtests of the OCDQ. Table 4 provides a summary of the findings related to this hypothesis.

The hypothesis was supported on five of the eight subtests. Of particular significance may be the findings that four of these five subtests relate to principal-teacher relationships: aloofness, production emphasis, thrust, and consideration.

Thrust and consideration were rated higher by teachers in the open school than by teachers in the closed school. Aloofness and production emphasis were rated higher by teachers in the closed school.

TABLE 4

ANALYSIS OF VARIANCE OF TEACHER SCORES ON OCDQ SUBTESTS BETWEEN SCHOOLS

OCDQ Subtests	Significance Level of *F*	Hypothesis Accepted
Disengagement	.153	No
Hindrance	.286	No
Esprit	.556	No
Intimacy	.041	Yes
Aloofness	.039	Yes
Production Emphasis	.005	Yes
Thrust	.001	Yes
Consideration	.016	Yes

The third hypothesis predicted that students in the two schools would perceive a significant difference in the openness dimension. Table 5 presents the summary of the analysis.

The hypothesis was not upheld. There was no significant difference in the mean scores of students on openness between the two schools.

TABLE 5

ANALYSIS OF VARIANCE OF STUDENT PERCEPTION OF OPENNESS BY SCHOOLS

Group	A	Mean
School A	180	3.24
School B	183	3.17
$F = 0.32$	$p = .569$	

The fourth hypothesis postulated a significant difference between the two schools on the student OCDQ subtest scores. Table 6 provides the information of the analysis.

Support for the hypothesis was limited; only two of the eight subtests, disengagement and aloofness, showed a difference in perception of students in the two schools. They were both lower in the open school, B.

Discussion

The findings in this study tend to support the following generalizations. A school that was considered to have a more open climate by experts and principals was also perceived to be more open by the teachers in that school. However, students in the open school did not perceive a difference in openness from students in a school classified as closed.

TABLE 6

ANALYSIS OF VARIANCE OF STUDENT SCORES ON OCDQ SUBTESTS BY SCHOOLS

OCDQ Subtests	Significance Level of *F*	Hypothesis Accepted
Disengagement	.044	Yes
Hindrance	.379	No
Esprit	.800	No
Intimacy	.244	No
Aloofness	.002	Yes
Production Emphasis	.810	No
Thrust	.350	No
Consideration	.192	No

The teachers of the two schools differed in their perceptions on five of the OCDQ subtests, the students differed in two. Teachers in the open school rated thrust, consideration and intimacy higher; aloofness and production emphasis lower than the teachers in the closed school. The students in the open school rated disengagement and aloofness lower than those in the closed school.

It may be that the findings relating to the teacher subtest scores lend credence to the overall result. Four of the five differences on mean subtest scores dealt with the teacher-principal relationship, and only one with the teacher-staff interaction. The openness dimension of the open school may be of administrative origin, making its impact on the staff, but hardly changing the staff situation itself.

Further the openness innovation seems to have faltered before reaching the students in the schools. However, the students in the open school indicated that they perceived less disengagement and aloofness in their school than the students in the closed school. This may indicate a beginning recognition of change in climate by the students.

Implications

1. In more general terms this study suggests that members at different levels of the school organization may view the climate of the organization in different ways. Questions could be raised as to which level of the hierarchy perceives most accurately the climate of the school. The educator or administrator might also question which level of the organizational structure should be studied to obtain the most meaningful interpretation of school climate. Is a school really open if the students in it perceive no difference in climate from that perceived by students in a closed school? For the administrator the key question may be that of deciding for whom openness is to be attained.

2. From all accounts the innovation of openness in the one school was introduced by the administration. This raises interesting questions relating to the introduction and implementation of innovations. For instance, how

could the administrators assist in the diffusion of the innovation through the whole school? Where should the innovation be introduced? What kinds of involvement of various members of the school organization would assist in maximum implementation? Who should be involved in the introduction of an innovation, and in what manner?

3. The difference in perceptions between the three levels in the schools studied hints at a differential impact of the innovation on climate. An interesting speculation is that changes in various subtests of climate may indicate the beginning of a change in perception of climate. In this study the principals were convinced that the schools differed on openness, the teachers were also convinced, but the students were not. Yet the students admitted to a difference in aloofness and disengagement. The OCDQ subtests may provide the more significant information.

4. Further research on the subtests could be carried out, especially how these relate to the openness dimension. In replications of this study several questions beg for attention. First, the adapted student version of the OCDQ needs further refinement. Second, a series of schools ranging from open to closed could be studied at the three organizational levels and the hypotheses tested on the resulting data. Third, the openness score should be calculated on the formula used in this study together with that used in the original OCDQ studies. More important than all of this is the question of the validity of the measures obtained and the validity of their comparisons.

Finally the question remained. For whom is the open climate designed, for administrators, teachers or students? How is it related to productivity? What kind of school climate or "personality" is conducive to adequate program planning? What alternatives exist for implementing a climate with a positive impact on program development? For such a climate to make a difference should it permeate the whole school so that the students "feel" it, or perceive it as well as teachers and administrators?

On the evidence of this study, it is possible to conjecture that the conditions suggested as prerequisite for effective program development (Miklos, 1965) have been partly achieved in the open school at the teacher level but not at the student level.

References

Andrews, John. School organizational climate: Some validity studies. *Canadian Education and Research Digest,* 1965, *5,* 317-334.

Appleberry, James B., & Hoy, Wayne K. The pupil control ideology of professional personnel in 'open' and 'closed' elementary schools. *Educational Administration Quarterly,* 1969, *5,* 74-85.

Bevan, George. An empirical study of the need for independence in high school students. Unpublished doctoral dissertation, The University of Alberta, Edmonton, 1970.

Etzioni, A. *A comparative analysis of complex organizations.* Glencoe Ill.: The Free Press, 1961.

Friesen, D. Open campus—a rationale. *The Canadian Administrator,* 1970, 10(2).

Halpin, Andrew W. & Croft, Don B. *The organizational climate of schools.* Chicago: Midwest Administration Center, University of Chicago, 1963.

Marsh, William Leon. Teacher and student perceptions of school climate. Unpublished master's thesis, The University of Alberta, Edmonton, 1970.

Marshall, George Narin. In a climate of freedom: a case study of an open campus composite high school. Unpublished master's thesis, The University of Alberta, Edmonton, 1970.

Miklos, Erwin. School climate and program development. *The Canadian Administrator,* 1965, 4(7).

Stryde, Sherman James. Relationships between the perceptions of the organizational climates of schools held by principals and by members of the teaching staffs. Unpublished master's thesis, The University of Alberta, 1966.

The Alberta Journal of Educational Research *Vol. XVIII, No. 2, June, 1972*

E. S. HICKCOX
and
D. J. DUCHARME

Administrative Staffing Patterns in Ontario School Districts

Characteristics of organization structure, administrator to student ratios, program integration, accountability flow, and decision-making were studied in 63 Ontario public school districts. Four categories of structure based on functions assigned to superintendents were identified: pure area, tiered, combination, and functional. Almost one-third of the boards in the sample have not reflected integration of elementary and secondary programs in their organization charts. In tiered organizations principals reported to area superintendents while in functional organizations they reported directly to central office. Information about administrative councils, where these existed, indicated that in no case were principals, teachers, or students a part of central decision-making. It was also found that the ratio of senior central office personnel to student population was inversely related to the size of the district. (Dr. Hickcox is an Associate Professor in the Department of Educational Administration at The Ontario Institute for Studies in Education; Mr. Ducharme is the Project Director at the OISE Midwestern Centre in Kitchener, Ontario.)

The reorganization of Ontario school systems into county units of administration in 1969 reduced the number of school boards in the province from 1700 to less than 200. The creation of these larger units triggered a massive restructuring of administrative roles in central offices across the province. This discussion focuses on structural patterns which have emerged since 1969.

Problem

The paper treats problems of organizational structure in a limited way. We examine the structure of the central office administrative staff including directors, superintendents, assistant superintendents and area superintendents. The analysis does not consider other central office personnel such as coordinators or consultants, nor does it treat the business side of the operation below the level of assistant superintendent of business.

In deciding how to approach the analysis of the information, we have been guided by two general considerations. First, we are aware of the general move toward accountability in education. Thus, analysis of structure must attempt to identify alternatives in organizational arrangements which will permit trustees to discover what they are getting for their money in terms of central office administration.

Second, we see decision-making as an important aspect of any administrative structure. Assumptions about how decisions should be made, what levels of the hierachy are involved and distribution of responsibility are reflected in the organizational structure adopted by any particular board. In analyzing organizational charts from the various school boards in Ontario, we were thus interested in the relationships between officials, in the make-up of administrative councils, in the configuration of superintendents, assistant superintendents and area superintendents, and in whether the structure appeared to be flat or tall.

Procedures

A request for information was mailed to the seventy-one school systems in the Province which have appointed a chief school officer called a director of education. The information requested included the following:

1. A current description of the system's organization structure including an organization chart.
2. A description of the functions and/or responsibilities of academic officials above the rank of principal.
3. An indication of the 'accountability flow' in the organization.
4. Policy books, regulations and by-laws.

The return rate on our request was eighty-nine percent; our sample, therefore, is composed of sixty-three out of a possible seventy-one public school boards.

As a preliminary step in the analysis, we selected fourteen boards representative of the various geographical regions, rural and urban systems, and systems which combined both rural and urban elements. Within this sub-sample, we examined organization structures with a view to developing categories of organizational patterns. Simultaneously, we collected data on student populations for all systems.

As a result of this preliminary examination, we were able to create a chart showing the following information for the sixty-three boards in the sample: pupil population, organization category, number of assistant or associate superintendents, number of area superintendents, number of combination superintendents (superintendents who have a functional responsibility such as personnel and also have an area responsibility in the system), number of director's assistants (e.g., executive assistant), official to whom principal reports, degree of integration of elementary and secondary programs, size of executive council, composition of executive council, total number of administrators above the rank of principal, and ratio of senior administrators to student population.

Organization Categories

One of the questions that prompted this study in the first instance was whether the organizational structures adopted by Ontario school boards since 1969 showed variation among the boards or whether all structures tended to be similar across the Province. We have identified four general categories of structure characteristic of these boards as follows:

1. Pure Area Type

All school systems in the sample have a chief school officer called a director at the top of the hierarchy. Below the director in systems adopting this structure are area superintendents plus a business superintendent. The area superintendents may be responsible for a geographical area, including all the elementary and secondary schools, or there may be an area superintendent responsible for all the secondary schools and one responsible for all the elementary schools. Principals report to the area superintendent directly, depending on the geographical area in which their schools are loacted. In this situation, the area superintendent is a generalist, responsible for program, personnel and facilities within the area. Except for the business function, there are no functional specialities performed at the superintendent level. In very small systems, the director himself may perform the function of area superintendent.

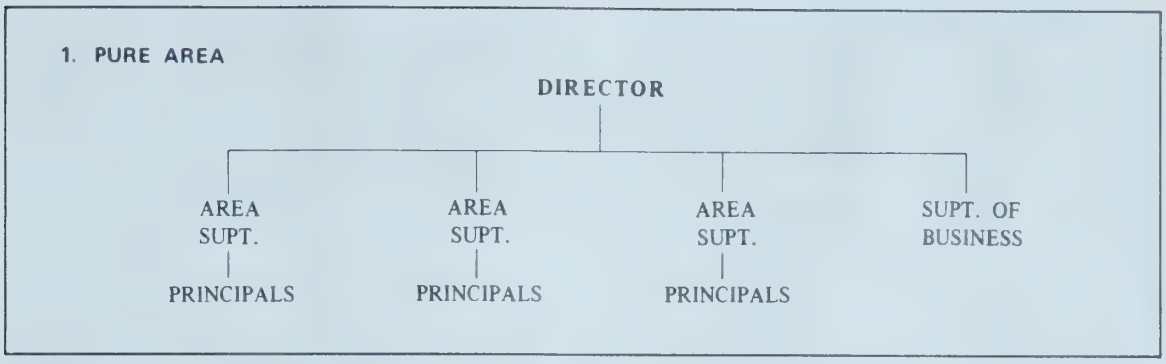
2. Tiered Structure Type

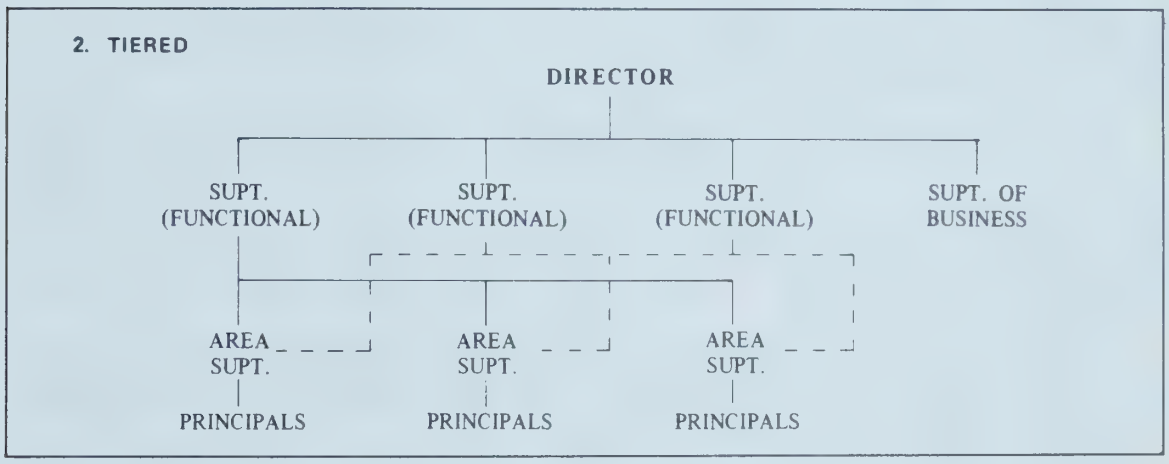
This structure is characterised by a director at the top with a second echelon of functional superintendents including a business superintendent. These superintendents have titles such as superintendent of instruction, superintendent of operations, superintendent of personnel and the like. Below this level in the organization chart are area superintendents who generally report to one of the functional superintendents, often the superintendent of operations. In four of the systems in our sample, however, the area superintendents do not report to one functional superintendent but have direct access and responsibility to all. Even in systems where the area superintendent reports to one functional superintendent, there are often dotted lines in the organization charts indicating that the area men can go directly to the various functional officials as the need arises.

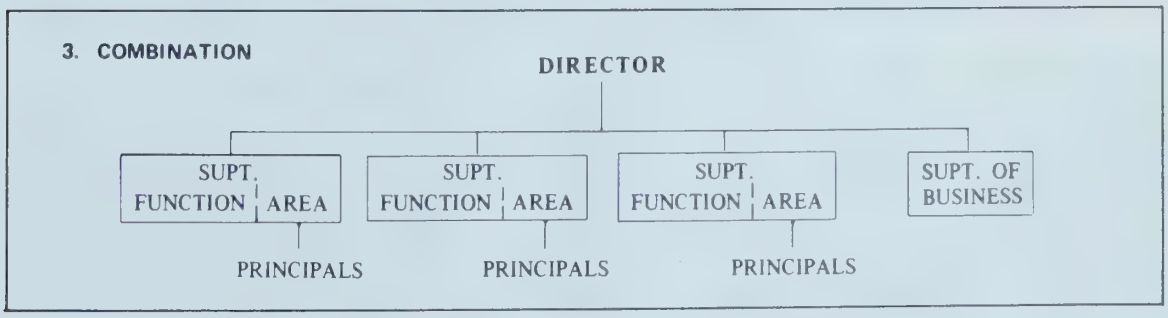
Principals in a tiered system report to their particular area superintendents and tend not to have direct access to the functional superintendent, with some exceptions. In the larger systems, the tiered pattern often shows two area superintendents for each area, and this most often implies one man responsible for secondary schools in the area and the other responsible for elementary schools.

3. Combination Type

In six of the systems in our sample, boards have opted for combining functional responsibilities and area responsibilities in one position. Thus, at the superintendent level, an individual will have responsibility for some function such as curriculum or personnel, and at the same time he will be in general charge of a geographical area.







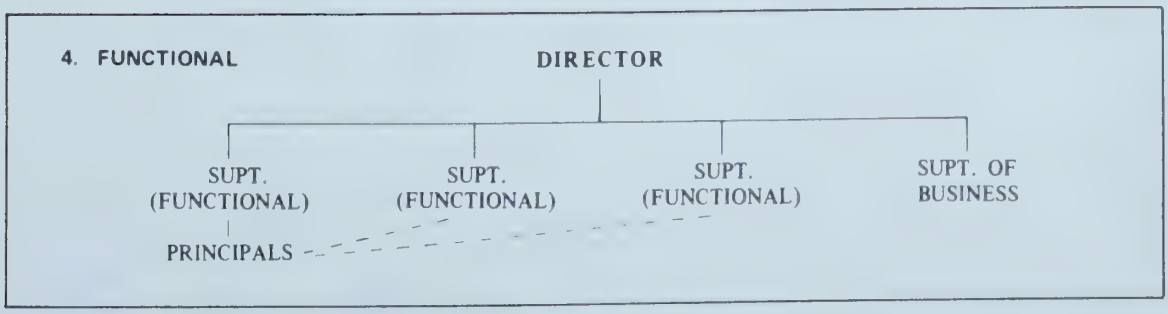


Figure 1—Four Types of Organization Structure.

Principals in such a structure report to a particular superintendent in his role as area supervisor. If assistance is required in functional areas other than the one for which the particular area man is responsible, the principal has only indirect access through his own supervisor. For example, if information about budget is required by a principal, he would probably ask his area supervisor to obtain it for him rather than going directly to the business office himself.

4. Functional Type

The final category exists in systems where the position of area superintendent has been eliminated. In this case, principals report directly to the functional superintedents for particular services. Thus if it is a problem in personnel, the principal would go directly to the superintendent of personnel. In some cases, principals would be directly responsible to one of the superintendents, for example, the superintendent of operations, but would have access to other functional areas.

We should note that small systems tend to look like functional types because they are not large enough to support a substantial central office staff. In several cases, for example, a system would have only a director and business administrator, and we were forced to categorize this as functional. We cannot say what would happen if these small systems were suddenly increased in size.

Table 1 shows in percentages the results of categorizing each of the sixty-three school boards according to the types described and according to pupil population of the various districts.

TABLE 1

ORGANIZATIONAL CATEGORIES OF SIXTY-THREE SCHOOL BOARDS ACCORDING TO PUPIL POPULATION OF DISTRICTS (REPORTED IN PERCENTAGES)

Pupil Population	Category					
	Pure Area	Tiered	Combination	Functional	Not known	Total
40,000 and over	2%	18%	2%	0%	0%	22%
20,000 to 39,999	2	13	2	3	0	20
13,000 to 19,999	0	13	3	3	0	19
5,000 to 12,999	3	3	3	8	2	19
less than 5,000	0	0	0	16	6	22
Total	7%	47%	10%	30%	8%	102%*

* % is greater than 100 because of rounding error.

Examination of these data shows that the tiered structure is most common, accounting for forty-seven per cent of the total. Next is the functional type, accounting for thirty per cent, followed by the combination type with ten per cent and the pure area type with seven per cent. From this information, it is evident that central office structure varies considerably.

Turning to the categories according to size, we note that the pure area type appears in three of the five population groups. That this structure is the least preferred of all is probably a reflection of the general move toward specialization in education. Area superintendents are by definition generalists, resonsible for all activities in their area, even as a director is a generalist, responsible for the total educational program of the district.

The larger systems, those above 13,000 pupil population, have tended to adopt the tiered structure. It is obvious, of course, that the smaller systems could not be listed in this category because by definition three levels of central office are required, director, superintendent and area superintendent.

It is interesting to try to account for the popularity of the tiered structure in large districts. School boards, we assume, have responded to the need for specialized skills at top levels in school systems by creating the functional superintendents. At the same time, they have established area offices in an attempt to maintain manageable operating units both in terms of geography and numbers of students. In effect, boards have created mini-systems within the district to foster the sense of personal contact between schools and the central office. The area superintendents also enable a board to ensure a measure of administrative competence throughout the district, especially in areas where there are many very small schools which may have principals who also teach in the classrooms and who may be quite inexperienced in administration.

The combination structure has been adopted by six boards in the sample; these six are spread throughout four of the population groups.

We interpret the combination structure as a variation of the tiered structure but with the intent of reducing the size of the central office component. Instead of having two men, one to be responsible for a functional area and one to be responsible for a geographical area, there is one individual performing both functions. Since combining two jobs into one does not decrease the amount of work which needs to be done, we assume that some of the functions of the two roles are carried on by lower echelon personnel, consultants, coordinators and principals, with a theoretical saving in costs. Superintendents, after all, carry a high price tag.

Finally, the functional structure has been adopted by nineteen boards in the sample. Whereas boards of the largest size have not turned to this plan, it is interesting to note that relatively large boards, in the 13,000 to 40,000 groups, have in four instances eliminated area superintendents. Eliminating area superintendents does not, of course, eliminate areas, nor the need for coordination by areas. At least one of these large systems has compensated for this by creating area principals' councils consisting

of all the secondary and elementary schools in the region. This council establishes its own program, depending on the needs of the area, but does not operate under the direct supervision of a central office official. Instead, representatives of each of the principals' councils are members of an administrative council which acts as the coordinating mechanism for the whole system. All of the functional superintendents sit on this administrative council which makes recommendations to the director for presentation to the board. Similarly, policy decisions by the board are channeled to the schools through this council.

Administrator-Student Ratios

To arrive at an administrator: student ratio, the total student population of a system was divided by the total number of senior central office administrators. Included in the administrator count were directors, associate/assistant directors, superintendents, associate/assistant superintendents, area superintendents, business administrators at the superintendent level and inspectors.

The boards were then ranked according to student population and the sample was divided into five groups with more or less equal numbers in each group. The median ratio for each group is reported in Table 2.

TABLE 2

MEDIAN ADMINISTRATOR: STUDENT RATIOS ACCORDING TO STUDENT POPULATION

Pupil Population	Median Administrator:Student Ratio
40,000 and over n=13	1:2980
20,000 to 39,999 n=12	1:2567
13,000 to 19,999 n=12	1:2211
5,000 to 12,999 n=12	1:2036
Less than 5,000 n=14	1:1217

The progressive increase in number of students per senior administrator as systems increase in size is immediately evident from Table 2. These results must be treated with caution however. Holdaway (1971), in a study of forty-one school systems in Western Canada, indicates that total non-instructional salary cost per pupil tends to increase consistently as the size of the school system increases. Our study has not examined total administrative structure as yet. Further study may indicate an optimum

size range for administrative efficiency. In systems which are too large, the principle of diminishing returns may operate.

One further word of caution. When speaking about optimum sizes for school systems, there are other factors which should be considered besides administrative efficiency as measured by student:administrator ratios and the attendant costs. Nature of services, dispersion of student population, political factors and cultural diversity are some which come to mind.

In looking at administrator: student ratios, we also singled out those systems which indicated a number of special assistants clustered around the director. These assistants might be information officers, computer specialists, executive assistants, and so forth. Our purpose in looking at these systems was to investigate the possible effects on administrator: student ratio of having one or more assistants clustered around the director.

Using the same population categories as indicated in Table 2, we find in the three middle groups a consistent indication that those which have appointed director's assistants have a greater number of students per senior administrator. In two of the three groups, the greater number of students is substantial.

For the smallest and the largest systems, the number of students per senior administrator is smaller for those systems with director's assistants. However, the difference is not substantial in the largest systems, and the N of 1 for the smallest systems with director's assistants belies any attempt to draw conclusions.

What are the implications of these figures? While the evidence we have presented is inconclusive and while there are other factors to be considered, it may be valuable for school boards to examine the following questions:

1. Are superintendents excessively burdened with the details of executing programs and policy decisions?
2. Could much of this detail be handled by someone in an administrative assistant capacity?

Put another way, the question is this: is it possible to free up an expensive superintendent's time by appointing a less expensive administrative assistant rather than an additional assistant superintendent?

Integration

There has been a move in recent years in education to adopt structures which reflect the integration of program from kindergarten through secondary school. Prior to reorganization in 1969, many Ontario communities maintained two entirely separate school systems, one for the elementary grades and one for the secondary grades. Even with the creation of county boards, some systems have retained the division within the overall framework by hiring superintendents of elementary schools and superintendents of secondary schools. Some boards have gone part way toward integration; some are fully integrated, at least on paper.

We have attempted to judge the extent to which the sixty-three systems in our sample reflect an integrated concept in their organizational structures. We define a fully integrated system as one in which functional superintendents and area superintendents are responsible for personnel, program and facilities on a K-13 basis. An area superintendent, for example, would be responsible for all the elementary and secondary schools in his area. A superintendent of curriculum would be responsible for curriculum in the elementary schools as well as in the secondary schools.

A partially integrated system is defined as one where there are two area superintendents for each area, one for elementary schools and one for secondary schools, or where certain of the functional responsibilities for superintendents are divided into elementary and secondary areas. That is, a superintendent might be responsible for personnel K-13 but the curriculum function might be assigned to two superintendents, one for elementary and one for secondary.

A non-integrated system is one where all the functions are divided into elementary and secondary, or where area superintendents are assigned either elementary or secondary responsibilities but not both.

The data show that fifty-five per cent of the districts reflect a fully integrated system in their organizational structure. Partial integration is shown for sixteen per cent of the districts, and fourteen percent indicate that they are not integrated. We were not able to determine the degree of integration for sixteen per cent of the school systems.

There is a slight tendency for larger districts to reflect full integration and for the smaller districts to reflect non-integration, although there is not enough variation to be meaningful.

It would be a mistake to assume that structural integration on an organizational chart represents a *fait accompli* for the educational program. Nevertheless, we suggest that systems reflecting integration in their structural arrangements have a better chance of accomplishing it in a program sense. Thus, the nineteen boards in our sample which do not show full integration in their organization charts will have greater difficulty in implementing a policy of program integration compared to the thirty-four boards which do show an integrated organization.

Accountability Flow

The general picture with respect to accountability flow has been discussed in the outline of organization categories. Our discussion at this point is restricted to the accountability of the in-school administrator, i.e., the principal and to whom he reports. The data are for the fifty-seven school boards which provided information on this topic.

In twenty-four of the twenty-nine tiered organizations for which we have information, the principal reports to the area superintendent, though in some instances he is able to by-pass the area superintendent if it is more appropriate to deal with a functional superintendent or the director. In thirteen of nineteen functional organizations, the principal reports to the superintendents. In all of the three pure area organizations,

the principal reports to the area superintendent, and in three of the six combination organizations, he reports to the superintendent.

The statistics clearly indicate the pattern but do not lead the observer to any immediate, dramatic conclusions. There are, however, important questions which arise as one considers the pattern and the principal's role in the school system. The general question is: What effect on the principal derives from his being several levels down in the chain of command in either a tiered or a functional structure? How does he perceive the status of his position? What effect does this have on his morale? How does he perceive his responsibility to the system vis a vis his responsibility to the school? How does the pattern affect the autonomy of the principal?

Executive Council

Twenty of the sixty-three boards in the sample provided us with information about their executive councils. In all cases, these councils include the director, second echelon academic superintendents and the superintendents and the superintendent of business or business administrator. In only one case were area superintendents included. Otherwise, there was no variation.

Again some interesting questions arise as one considers the composition of this executive body. In particular, what effect does restricting the membership of the executive council have on decision-making? Would there be more commitment to decisions if some representatives of the lower echelons were included on this council? Would it be useful to have in-school administrators and teachers represented on the executive council? How would such an arrangement affect morale? the frequency of conflict situations?

Conclusions

The results of the study show that there is considerable variation in types of organizational structure which have been adopted by public school boards in Ontario since 1969. The variation centers around the functions assigned to the superintendents of the systems, whether they are functional roles or area roles or some combination of these. We find, also that the ratio of senior central office personnel to student population decreases with the increase of the size of the district. Although one of the purposes of establishing county board systems was to achieve integration between elementary and secondary panels, we find that at least thirty per cent of the boards in our sample have not reflected full integration in their organizational charts. In terms of accountability, we find that in tiered organizations, principals report to area superintendents whereas in functional organizations, they report directly to the central office. In tiered organizations, therefore, principals tend to be removed from the center of decision-making, although in some tiered systems direct channels to the central office have been established. Finally, for those systems reporting information about administrative councils, we find that membership on these is limited to directors and

superintendents with one exception. In no case were principals, teachers or students part of this central decision-making body.

We do not imply in this study that structural concerns of the type discussed have a direct relation to the teaching-learning process. This occurs, of course, in the interaction between teacher and student. Nevertheless, it is our view that trustees and administrators must establish structures and relationships within those structures which will promote communication flow in all directions, enable programs to function in terms of objectives and in the end permit the teaching-learning proces to occur in an efficient and effective manner.

References

Holdaway, E. A. Staffing metropolitan school districts. *The Canadian Administrator,* 1971, *10*(7), 29-33.

The Alberta Journal of Educational Research *Vol. XVIII, No. 2, June, 1972*

E. H. HUMPHREYS

Inequality and Rural Schools: Results of Surveys in 1967 and 1969

Surveys of Ontario elementary school teachers attempted to illuminate the relation between educational opportunity in terms of facilities, personnel and services, and the type of community in which a student lives. Data from questionnaire responses of 880 teachers in 1967 and 720 in 1969 indicated that a relationship exists between community type and (i) size of school, (ii) size of class (in 1967 but not 1969), (iii) availability of teaching aids, (iv) level of teachers' qualifications, (v) teaching experience (in 1969 but not 1967), (vi) availability of consultants, (vii) availability of special classes for atypical children, (viii) provision of special services, and (ix) employment of innovative practices. The relations generally favour urban children over those who live in rural communities. (Dr. Humphreys is an Assistant Professor in the Educational Planning Department at The Ontario Institute for Studies in Education.)

The mechanization of agriculture and the subsequent migration of young people to the city places a great responsibility on schools in rural areas to prepare children for the changing conditions they will meet throughout their lives. Numerous studies have examined the problems encountered by the rural migrants as they leave the rural economy and enter the urban work force. Porter (1965, p. 143), the Royal Commission on Education and Youth (1967, p. 13), Peitchinis (1969, p. 40), and the Special Planning Secretariat of the Privy Council (1965, pp. 7 and 15) have all called for a system of education that will prepare those who remain on farms for innovations in agriculture and those who migrate to the city for the conditions of work and life in an urban environment.

Problem

Do our present rural schools provide opportunities equal to the challenge? Do rural schools enable their students to compete with students from urban settings? This paper approaches these questions in terms of the "differences of the community's input to the school"

(Coleman, 1968, p. 16). The comparison of inputs is based on the Parsonian statement of opportunity; that is, opportunity is conceived of in terms of "a concrete resource aspect on the one hand, a normative controlled 'mechanism' or standard aspect on the other" (Parsons, 1964, p. 90).

The concrete factors—those related to the physical structure and facilities and to the staffing connected with them—were assessed. While it is primarily the concrete resource aspect that was dealt with here, the fact that normative factors are critical to the success of any educational enterprise should be borne in mind. the methods used to collect the data used in this study did not allow for consideration of normative factors; they did allow, however, for the collection of data on services that are related to the school program, as well as on physical structure and staff. The three groups of factors that were assessed were subdivided as follows:

Physical	Staff	Service
Size of School (Number of Teachers)	Level of Teaching Certificates	Availability of Special Classes for Atypical Children
Size of Class (Number of Students)	Teaching Experience	Provision of Special Services
Availability of Teaching Aids	Availability of Consultants	Extent of Innovations

Assumption

The factors assessed are regarded as indicators of the degree of commitment to a good education, but they are not the sole guarantee of the quality of the experience of children in the classroom. The author agrees with Coleman that "equality of opportunity is not so much determined by equality of the resources inputs, but by the power of these resources in bringing about achievement." (1968, p. 22)

While normative factors play a key role in the education of young children, as do the qualities of the relationships which exist between students and teachers, the availability of good teachers, adequate facilities, and the provision of necessary services also play their part in enhancing educational experience. Notwithstanding the findings of Coleman (1966), concrete factors can be assumed to be important to education; inputs are related to outputs.

Physical Factors

The three groups of physical factors used to assess the quality of schools were (a) size of school, (b) size of class, and (c) availability of teaching aids.

The size of the school indicates the degree to which facilities and experienced teaching, resource, and administrative personnel can be provided. It also indicates the difficulties teachers may encounter in coping

with students who differ in interests, age, and aptitude. It appears that schools with from about nine to twenty-five teachers are most appropriate at the elementary level (Sollars, 1963; Gentry & Kenney, 1967; and The Metropolitan Toronto School Board, 1968).

The size of class indicates the work load imposed on the teacher and the student's chance of receiving individual attention when needed. The larger the class, the less the time available for individual student-teacher interaction and the greater the teacher's difficulty in carrying out other duties. Small classes may indicate that specialized class groupings are being used to meet individual needs.

Assuming the presence of competent teachers who are able to utilize teaching aids, it seems likely that the greater the availability of aids, the better the teaching-learning situation. Reference books, films, and scientific apparatus are now tools of the trade and provide children with opportunities for vicarious experiences that are only possible if such aids are available.

Staff Factors

The quality of teaching staff is the most critical determinant of quality education. Data were obtained on three indicators of the quality of teaching: level of the certification of the teachers, their teaching experience, and the availability of consultants. While these three variables may indicate the potential for good teaching they do not necessarily measure the actual quality of the teaching-learning process. Such a measurement is beyond the scope of this study.

Of course the *quality* of the experience of a teacher is difficult to gauge. A teacher with six or eight years of classroom experience should be better than one with only one or two years. But would the same be true of a teacher with eighteen years experience as opposed to one with eight years?

In this study experience up to ten years was viewed as an asset; experience beyond ten years was considered to be of less value. In Ontario, consultants are experienced and well-qualified teachers who stay abreast of new developments in their disciplines and provide specialist help to trained teachers with more general training. Their availability is most necessary where less experienced or less qualified teachers are more frequently found.

Service Factors

The service factors assessed were the availability of special classes for atypical children, the provision of special student services (e.g., physicians, psychologists), and the extent of innovative practices. Schools can function without the same services, but their addition indicates an extension of the educational function of the school.

While special classes are not now universally accepted as the best method for educating atypical children,[1] it is probably safe to assume that

[1] A thorough discussion of this issue is contained in *One million children,* a report of the Commission on Emotional and Learning Disorders in Children (pp. 89-101). This study recommends that atypical children be retained "within regular school curricula and activities," but with specialized teaching assistance, and that those who "receive special instruction or treatment outside of the classroom . . . return to it at any time as a member in good standing" (p. 146).

the existence of such classes in 1967 or 1969 signified a recognition of the needs in this area. Data on classes for gifted, for slow learners, and for the physically and emotionally handicapped should provide evidence of the relation between community type and the provision of facilities and services for atypical children.

The availability of the professional services of nurses, physicians, psychologists and psychiatrists, dentists, and social workers may indicate the community's willingness to provide services for the physical, emotional, and social well-being of the student and its recognition of the relationship between such services and the academic and intellectual well-being of the individual.

Innovations may be regarded as an indication of the school's receptivity to new ideas. In total, enquiries were made about twelve innovations. Some do not require major expenditures. Although not all of the innovations assessed in this study would be considered by every educator as either positive or effective, the majority would be so viewed. Special language instruction for non-English speaking students and junior kindergartens for four-year-olds may be more appropriate in urban areas, for example, but most innovations should prove valuable in any area.

History and Organization of the Present Study

In response to the amalgamation of school districts in Ontario in 1965, the Ontario Teachers' Federation initiated a survey of school districts in the same year. This survey was replicated in 1967 and again in 1969, when the scope of the survey was enlarged to include teachers in all public and separate elementary schools (see OTF, 1965; Humphreys, 1967, 1970).

In each survey a population of teachers employed in publicly supported elementary schools was requested to complete a mailed questionnaire. Some of the data collected in the spring of 1967 and 1969 have been used in the present study. Of the 1967 stratified sample of 880 elementary school teachers, 720, or 81.8%, replied. In 1969, a stratified and weighted sample of 1,189 teachers returned 954, or 80.2%, of the questionnaires.[2]

Responses were classified by type of community on the basis of answers to the following question:

From what type of community does this school draw *most* of its students?

Check *one*:
1._____Farming Community
2._____Village or Small Town (under 10,000 population)
3._____Small City (10,000 to 50,000 population)
4._____Large City or Metropolitan Area (50,000 Population or more)

Analysis of the questionnaires has been carried out using this classification. The year of data collection and the religious orientation of the school jurisdiction were controlled. A chi-square value was calculated across each contingency table, with the type of community on one axis and the item categories on the other. Tables included in this paper provide a summary of these χ^2 values.

[2] Due to the limited nature of the 1965 study, no data from that survey have been used here. Further data were collected in 1971.

Results

Size of School

As one would expect, the more urban an area, the larger its schools. Of the 16.6% of all Ontario teachers reported schools of twenty-seven or more teachers in 1969, most were in more urban areas. At the same time, of the 12.9% of all Ontario teachers that had eight or fewer colleagues, most were located in farming communities. The data for 1967 indicate a similar situation. The relation between school size and community type is indicated in Table 1.

TABLE 1

SUMMARY OF CHI-SQUARE VALUES AND LEVEL OF SIGNIFICANCE OF THE RELATION BETWEEN NUMBER OF TEACHERS PER SCHOOL AND COMMUNITY TYPE

Relation Tested	Public Schools 1967			Public Schools 1969			Separate Schools 1969		
	χ^2	df	p	χ^2	df	p	χ^2	df	p
Community Type by Teachers per School	337.81	24	.001	136.64	24	.001	92.03	24	.001

Size of Class

The data in Table 2 indicate that although a significant relationship between class size and community type existed in public schools in 1967, no such relationship existed in 1969 in either public or separate schools. In 1969 class sizes of between twenty-one and forty students were reported by about 80% of the teachers. Only 1% reported classes larger than forty students, and 11% reported classes with fewer than twenty-one students. The balance reported no class.

TABLE 2

SUMMARY OF CHI-SQUARE VALUES AND LEVEL OF SIGNIFICANCE OF THE RELATION BETWEEN THE NUMBER OF STUDENTS PER CLASS AND COMMUNITY TYPE

Relation Tested	Public Schools 1967			Public Schools 1969			Separate Schools 1969		
	χ^2	df	p	χ^2	df	p	χ^2	df	p
Community Type by Students per Class	34.25	15	.001	18.59	15	N.S.	22.39	15	N.S.

Availability of Teaching Aids

Table 3 shows that of thirty-three tests of inequality, only eight (all in 1969) indicated no relation between the community and the availability of an aid. In 1967 all eleven aids were found to be differentially distributed—the urban areas being in every case better supported by aids.

TABLE 3

SUMMARY OF CHI-SQUARE VALUES AND LEVEL OF SIGNIFICANCE OF THE RELATION BETWEEN AVAILABILITY OF TEACHING AIDS AND COMMUNITY TYPE

Relation Tested	Public Schools 1967			Public Schools 1969			Separate Schools 1969		
	χ^2	df	p	χ^2	df	p	χ^2	df	p
Community Type by Availability of:									
Classroom References	7.96	3	.05	5.22	3	N.S.	2.80	3	N.S.
School Libraries	114.83	3	.001	68.07	3	.001	35.35	3	.001
Professional Libraries	129.72	3	.001	97.02	3	.001	27.20	3	.001
Movie Projectors	172.89	3	.001	40.24	3	.001	31.73	3	.001
Filmstrip Projectors	80.47	3	.001	6.84	3	N.S.	17.54	3	.001
Record Players	45.76	3	.001	11.91	3	.01	3.26	3	N.S.
Tape Recorders	136.54	3	.001	16.09	3	.01	17.84	3	.001
Television Sets	60.10	3	.001	13.43	3	.01	2.17	3	N.S.
Standardized Tests	27.67	3	.001	5.80	3	N.S.	26.00	3	.001
Music Equipment	11.54	3	.01	4.65	3	N.S.	6.94	3	N.S.
Science Equipment	42.24	3	.001	13.99	3	.01	19.41	3	.001

It is also instructive to examine the types of aids available—that is, whether they are oriented towards "equipment" and "hardware" or towards "software" and "content." In our study, the aids least frequently found were library resources for professional, reference, and student use, science equipment, and standardized tests. Those most frequently found were of the equipment or hardware variety, such as projectors, phonographs, tape recorders, and television sets.

Level of Teaching Certificates

The certification of Ontario teachers depends on the level of academic and professional education they have obtained in preparing for their role as teacher. Elementary school teachers with one year of professional training beyond grade 13 graduation hold Standard 1 certificates. Those with

one year of professional training beyond a B.A. or comparable degree hold Standard 4 certificates.

Table 4 indicates there is a significant relation between the type of community in which a teacher was employed and the teacher's level of certification. Teachers in farming communities were not on the whole as well qualified as their colleagues in urban areas. In 1969 59.9% of public school teachers in farming communities and 47.8% of those in large cities held minimum qualifications. Of public elementary school teachers in large cities, 22.6% held a Standard 4 certificate as compared to only 5.9% with such qualifications in farming communities.

TABLE 4

SUMMARY OF CHI-SQUARE VALUES AND LEVEL OF SIGNIFICANCE OF THE RELATION BETWEEN LEVEL OF TEACHING CERTIFICATES AND COMMUNITY TYPE

Relation Tested	Public Schools 1967			Public Schools 1969			Separate Schools 1969		
	χ^2	df	p	χ^2	df	p	χ^2	df	p
Community Type by Level of Teaching Certificates	70.89	24	.001	54.46	24	.001	65.90	24	.001

Teaching Experience

The length of experience of public school teachers was not differentially distributed in 1967, but it was in 1969. The data for 1969 indicated that the public school teachers in large city schools had less teaching experience on the average than those teaching in schools in farming communities. Only 31.4% of the teachers in large cities reported eleven or more years experience, as opposed to 49.3% in farming communities. Conversely, 37.7% of the teachers in large city schools had four years experience or less, while only 22.3% reported this little experience in farming communities. Some problems of a balance between the number of more experienced and less experienced staff appears in rural public schools and in urban separate schools.[3]

Availability of Consultants

Seven relations were tested between the availability of consultants and community type for the three sets of data. All proved to be significant; in both 1967 and 1969, consultants were available to the urban teacher

[3] The reader is referred to a brief discussion of this point in Edward H. Humphreys, *Schools in change: A comparative survey of elementary school services, facilities and personnel, 1965-1969* (Toronto: Ontario Institute for Studies in Education, 1970), pp. 7-8. There was some evidence that rural areas relied heavily on women teachers who had left the profession to raise a family and returned some time later when the teaching shortage became acute in these areas. In many cases no retraining was undertaken, and the skills, attitudes, and approaches of such teachers were characteristic of the period when their training and certification were originally obtained.

TABLE 5

SUMMARY OF CHI-SQUARE VALUES AND LEVEL OF SIGNIFICANCE OF THE RELATION BETWEEN TEACHING EXPERIENCE AND COMMUNITY TYPE

Relation Tested	Public Schools 1967			Public Schools 1969			Separate Schools 1969		
	χ^2	df	p	χ^2	df	p	χ^2	df	p
Community Type by Teaching Experience	24.64	24	N.S.	52.43	24	.001	40.81	24	.05

far more often than to the rural teacher, whether in public or in separate schools. According to the replies of public school teachers in 1969, urban teachers had access three times as often to consultants in mathematics and/or science, four times as often to reading consultants, five times as often to art consultants, twice as often to music consultants, about six times as often to speech consultants, over three times as often to physical education consultants, and four times as often to special and/or auxiliary consultants. Although the overall extent of availability was lower in separate schools, similar disparities between community types existed.

TABLE 6

SUMMARY OF CHI-SQUARE VALUES AND LEVEL OF SIGNIFICANCE OF THE RELATION BETWEEN AVAILABILITY OF CONSULTANTS AND COMMUNITY TYPE

Relation Tested	Public Schools 1967			Public Schools 1969			Separate Schools 1969		
	χ^2	df	p	χ^2	df	p	χ^2	df	p
Community Type by Availability of Consultants for:									
Science/ Mathematics	265.93	3	.001	109.72	3	.001	37.02	3	.001
Reading	363.81	3	.001	145.94	3	.001	80.40	3	.001
Art	446.16	3	.001	174.35	3	.001	131.53	3	.001
Music	160.64	3	.001	91.00	3	.001	70.45	3	.001
Speech	487.44	3	.001	200.73	3	.001	131.95	3	.001
Physical Education	382.92	3	.001	134.81	3	.001	87.97	3	.001
Auxiliary	254.03	3	.001	110.92	3	.001	36.75	3	.001

Availability of Special Classes for Atypical Children

Every one of the tests reported in Table 7—for public schools in 1967 and for both public and separate schools in 1969—indicates that the provision of special classes for atypical children was closely related to community type. Rural areas provided fewer classes than urban areas. Classes for slow learners were reported in 20% more city than farm area reports, while other special classes were reported by seven to ten times more public school teachers from large cities than from farming communities. The differences between urban and rural areas in the separate school system were also great. There is obviously much greater opportunity for the atypical child in large cities than in farming communities.

TABLE 7

SUMMARY OF CHI-SQUARE VALUES AND LEVEL OF SIGNIFICANCE OF THE RELATION BETWEEN AVAILABILITY OF SPECIAL CLASSES AND COMMUNITY TYPE

Relation Tested	Public Schools 1967			Public Schools 1969			Separate Schools 1969		
	χ^2	df	p	χ^2	df	p	χ^2	df	p
Community Type by Availability of: Special Classes for Gifted or Accelerated Learners	236.69	3	.001	128.20	3	.001	10.28	3	.001
Slow Learners (auxiliary)	158.60	3	.001	24.75	3	.001	43.35	3	.001
Physically Handicapped	215.68	3	.001	54.23	3	.001	25.06	3	.001
Emotionally Handicapped	200.03	3	.001	120.22	3	.001	48.50	3	.001

Provision of Special Services

Of the fifteen tests of the relation between the provision of professional services and community type, fourteen showed that services were generally more available in urban than in rural communities. While nurses were almost universally available in 1969, only 38.4% of the public school teachers in large cities and 10.5% of the teachers in farming communities reported access to school physicians. Four times as many urban (92.5%) as rural (24.3%) public school teachers reported that psychologists or psychiatrists were available, and similar differences were true for dentists. While 37.1% of public school teachers in large cities indicated a social worker was available, this figure dropped to only 2.6% in farming communities. The reports of separate school teachers did not indicate that differences between rural and urban areas in the availability of special services were as great as in the public schools.

TABLE 8

SUMMARY OF CHI-SQUARE VALUES AND LEVEL OF SIGNIFICANCE OF THE RELATION BETWEEN PROVISION OF SPECIAL SERVICES AND COMMUNITY TYPE

Relation Tested	Public Schools 1967			Public Schools 1969			Separate Schools 1969		
	χ^2	df	p	χ^2	df	p	χ^2	df	p
Community Type by Provision of a:									
Nurse	18.87	3	.001	5.82	3	N.S.	10.83	3	.05
Physician	113.90	3	.001	57.99	3	.001	29.47	3	.001
Psychologist or Psychiatrist (by referral)	387.85	3	.001	161.70	3	.001	74.11	3	.001
Dentist	229.82	3	.001	110.05	3	.001	32.31	3	.001
Social Worker	150.37	3	.001	86.51	3	.001	38.63	3	.001

Extent of Innovations

In 1967, the type of community in which teachers were employed was found to be related to all twelve of the innovative practices assessed. By 1969, three innovations—group instruction in arithmetic, unit promotion, and mid-year promotion—were found as often in rural as in urban public schools. In separate schools (1969), no relation was found between community type and the use of seven of the twelve innovations. Only two innovations—group instruction in reading and report cards without marks, grades, or standings—were employed by more than 50% of the teachers, indicating a low level in the use of these twelve innovations. This low level is far more evident in schools in farming communities than in those in large cities.

Summary and Conclusion

This paper attempts to shed some light on the relation between educational opportunity, in terms of facilities, personnel, and services, and the type of community in which a student lives. The need for such an examination arises from the recognition that rural students who migrate to urban areas will be obliged to compete with graduates of urban schools in order to obtain employment. We must ask whether rural schools provide opportunities for their students comparable to those in urban areas. In his review of research on the education of disadvantaged rural youth, Edgington supports the need for improving rural education:

> The movement of sub-population in the United States today is such that rural areas feed their problems and special characteristics into urban suburban populations. Although the problems of rural disadvantaged children, as this survey has shown, are not unlike those of other youngsters, rurality does impose certain conditions which exacerbate educational problems (Edington, 1970, p. 82).

This observation applies as well to Canada as to the United States since we also are experiencing the migration of rural youth to our cities.

TABLE 9

SUMMARY OF CHI-SQUARE VALUES AND LEVEL OF SIGNIFICANCE OF THE RELATION BETWEEN EXTENT OF INNOVATIONS AND COMMUNITY TYPE

Relation Tested	Public Schools 1967			Public Schools 1969			Separate Schools 1969		
	χ^2	df	p	χ^2	df	p	χ^2	df	p
Community Type by Extent of Innovations:									
Team Teaching	13.12	3	.01	7.98	3	.05	14.13	3	.01
Group Instruction in Reading	17.87	3	.001	11.27	3	.05	6.49	3	N.S.
Group Instruction in Arithmetic	17.90	3	.001	5.58	3	N.S.	6.07	3	N.S.
Non-Graded Instruction	14.04	3	.01	25.09	3	.001	10.90	3	.05
Unit Promotion	19.64	3	.001	5.24	3	N.S.	2.11	3	N.S.
Mid-Year Promotion	18.14	3	.001	4.97	3	N.S.	2.86	3	N.S.
Special Language Instruction for Non-English Speakers	130.07	3	.001	85.25	3	.001	43.37	3	.001
Special Program for the Culturally Deprived	18.91	3	.001	19.33	3	.001	4.02	3	N.S.
Kindergartens for 4-Year-Olds	59.87	3	.001	63.58	3	.001	5.94	3	N.S.
Guidance Services	48.38	3	.001	32.78	3	.001	22.38	3	.001
No Marks, Grades, or Standings on Reports	16.42	3	.001	27.34	3	.001	0.81	3	N.S.
Individual Student Program	36.22	3	.001	34.11	3	.001	15.22	3	.01

In this study of the provision of services, facilities, and personnel in Ontario elementary schools, an attempt has been made to examine one of the "conditions which exacerbate educational problems." The evidence indicates that a relation exists between the provision of facilities, personnel, and services and the type of community in which the teacher respondents were employed. Insofar as the availability of the concrete resource aspects of education included in this study are indicative of the quality of education, one can conclude that Ontario students in urban communities are far better served than those in farming communities.

Although it should be recognized that the attitudes and aspirations of rural families may not result in as great a stress being placed on education, it is probable that the lower personal incomes of many rural residents and the resulting economic pressures have tended to maintain low standards of educational provision. Educational grants have raised the standards somewhat, but obviously far more needs to be done to overcome the reliance on property taxation as a major source of educational funding. Such a tax base creates anomalies in the amounts spent on education and hence in educational opportunity.

The creation of larger units of administration in Ontario in 1969 has helped to make the tax base more equitable, but at the same time, it has created major conflicts about the property tax, as rates formerly paid only by more urban property owners were extended to rural ones. While this has resulted in an improvement in the quality of facilities, services, and personnel in rural areas, it has also increased the cost of education to rural families with low incomes. Only an infusion of tax rebates has been able to quiet the complaints of Ontario's rural taxpayers.

A more rational process of equalizing educational opportunity for rural young people must be found. If society does not provide support for an adequate education before young people leave the farm, it must be prepared to support unemployed farm migrants in the cities while they gain the education they need to obtain a job. As far as basic education is concerned, the former course of action is obviously more appropriate, although training for work in specialized industries might be better provided after young people have migrated to the cities.

This study illustrates that Ontario fails to provide the educational opportunities in rural areas that are needed to ease the adjustment of young people forced to migrate to the cities. It would seem more rational to at least provide all young people with the "equal right to be recognized as unequal (Rogoff, 1961, p. 146)."

References

Canada: Privy Council, special planning secretariat. *Profile of poverty in Canada: summary.* Mimeo document, 1965.

Coleman, J. S. The concept of equality of educational opportunity. *Harvard Educational Review,* 1968, *38*, No. 1, 7-22.

Coleman, J. S. *et al. Equality of educational opportunity.* Washington: United States Government Printing Office, 1966.

Commission on Emotional and Learning Disorders in Children. *One million children —the CELDIC report.* Toronto: CELDIC, 1970.

Edington, E. D. Disadvantaged rural youth. *Review of Educational Research,* 1970, *40,* No. 1, 69-85.

Gentry, H. W., & Kenney, J. B. The relationship between the organizational climate in elementary schools and school location, school size and the economic level of the school community. *Urban Education,* 1967, *3,* No. 1, 19-31.

Humphreys, E. H. *A comparative survey of school districts in Ontario.* Toronto: Ontario Teachers' Federation, 1967.

Humphreys, E. H. *Schools in change; A comparative survey of elementary school services, facilities and personnel 1965-1969.* Toronto: Ontario Institute for Studies in Education, 1970.

The Metropolitan Toronto School Board, Study of Educational Facilities. *SEF-1. Educational specifications and user requirements for elementary (K-6) schools.* Toronto: The Ryerson Press, 1968.

Ontario Teachers' Federation. *A survey of the consolidation of Ontario school districts.* Toronto: Ontario Teachers' Federation, 1965.

Parsons, T. A functional theory of change. In A. Etzioni, & E. Etzioni (Eds.), *Social change.* New York: Basic Books Inc., 1964, 83-97.

Peitchinis, S. G. *Equality and inequality of opportunity for economic and social development.* Mimeo, Department of Economics, University of Calgary, Human Resources Research Council of Alberta, 1969.

Porter, J. *The vertical mosaic.* Toronto: The University of Toronto Press, 1965.

Report of the royal commission on education and youth. Vol. 1, St. Johns, Province of Newfoundland and Labrador: 1967.

Rogoff, N. American public schools and equality of opportunity. In A. H. Halsey, J. Floud & C. A. Anderson (Eds.), *Education, economy and society.* New York: The Free Press, 1961.

Sollars, R. D. The relationship of size of elementary schools to operational cost and program quality. *Dissertation abstracts.* 1963, 23: 3214 No. 9.

The Alberta Journal of Educational Research *Vol. XVIII, No. 2, June ,1972*

R. N. MacGREGOR

A Review of Selected Art Tests and Evaluative Instruments

A number of art tests and evaluative instruments are described and comments are offered on their suitability for various purposes. The tests are classified under four main headings: art tests as measures of "aesthetic preference"; multiple trait measures; art tests as indices of concept forming ability; and art tests as measures of social and personal adjustment. It is suggested that the complex nature of the variables with which art measures are concerned makes careful considerations of their characteristics and limitations mandatory if defensible conclusions are to be drawn from results. (Dr. MacGregor is an Assistant Professor in the Department of Secondary Education at The University of Alberta.)

Although one might intuitively suspect that art is a field which does not lend itself readily to standardized testing, a considerable number of measures purporting to isolate and to identify art behaviors have been devised within the past fifty years. From time to time the better known of these are put to use in studies which require an index of artistic performance or aesthetic response. If an art test is selected for such a purpose by a researcher, it is obviously in his interest to ensure that it is measuring what he expects it to measure. Yet at this time there has been little systematic, critical examination of art and art-related tests. This article attempts to summarize a number of the better known tests and to provide some guidelines for their appropriate use.

Measures of "Aesthetic Preference"

The early years of the twentieth century saw the regimented practices of the Walter Smith-influenced art program give way to the exercise of more liberal experiences, designed to cultivate the feelings, or "the finer sensibilities." It was therefore to be expected that some of the earliest research into the design of art tests should have as its focus the extent to which the aesthetic predilections of the subjects were re-

vealed by the testing instrument. Poffenberger and Barrows', "Feeling Value of Lines" (1924) described a procedure in which subjects chose from a number of adjectives one which best epitomized the character of a particular line. Their instrument was developed from earlier researches by Lundholm (1921) who had used eight subjects to draw lines purporting to embody the qualities of certain words. Poffenberger and Barrows reversed Lundholm's process and enlarged the number of subjects to 500 "educated people".

Although they reported a "substantial" measure of agreement among subjects, the reasons for such agreement are most probably to be found among Lundholm's sources, namely, in the writing of art historians and critics. These have dealt extensively with the architectonic features of art works, pointing out the presence of compositional rhythms and structural underpinnings and indicating how the eye "soars" or "lingers" in response to these features. As a result, a mythic fabric of association has developed by which ascending lines become identified with optimism and jagged lines with activity or rage. The fact that the 500 subjects referred to in the Poffenberger-Barrows study were explicitly termed "educated" lends support to conjecture that they were responding to a previously acquired body of associative material rather than to any intrinsic, affective properties possessed by the lines.

The McAdory Art Test appeared in 1929; it consists of 72 plates, each containing four variations of one picture. The variations involve changes in proportions, intensity and color within subcategories comprising furniture and utensils, textiles and clothing, architecture and related arts, shape and line arrangement, massing of light and dark, and color schemes. An examinee is asked to record his preferences, and is scored on a key designed by 100 experts (architects, artists and critics). That all items in the key were agreed upon by at least 64 per cent of the experts is in itself remarkable, considering their number and diversity (Greene, 1952). But, just as a dictionary is as much a record of how words are used as how they should be used, so the McAdory Test may be suspected of offering an indication of accepted conventional tenets in art in 1929.

Throughout the thirties, experimenters continued to favor tests in which preferences for one object over another were called for. The Meier-Seashore Test published in 1940 comprises 100 small uncolored pairs of pictures. One member of each pair is a reproduction of a "recognized masterpiece" (landscape, pottery, portraits, murals, medallions, etc.). The other shows the masterpieces with some alterations. The subject chooses the "better" of the two and the score he receives is derived from a key developed by artists, art teachers, and art training directors. The general similarity of the Meier-Seashore and the McAdory test, insofar as both reflect expert consensus, may account for the moderate (.37) correlations achieved between them in tests using small groups of college students (Greene, 1952).

A study of the Meier-Seashore pairs of pictures reveals that the alterations made to the originals to form the alternative picture choice are characterized by disturbance of the conventional principles of composition (i.e. the greatest value intensities should occur in the foreground; one

large block of matter ought to be balanced by several small ones; and so on). The Graves Design Judgement Test (1948), while using these same conventions, eliminates the possibly distracting effects of subject matter by including only non-representational designs. The test was validated by trying out 150 items on groups of art teachers, art students, and others in related and non-related fields. Selection of a final 90 items was made on agreement among teachers, significant differences between art and non-art students and items correlating highly with total test scores. Whatever their purported objectives, the tests which have been described are based primarily upon acquaintance with current canons of taste; individual or unconventional responses are penalized. Responses are founded on social as much as on aesthetic criteria.

Multiple Trait Measures

Study of the history of art reveals that each artist develops a recognizable working style or "strategy" by which he may be identified and placed on a continuum of styles. This possibility has been utilized by Burkhart (1962), Beittel (1963), and Bernheim (1964) in the development of procedures to assign art works to particular categories on the strength of the number and kind of work strategy characteristics exhibited within the work.

Flick (1963) attempted to show that Lowenfeld's "visual" and "haptic" types were characterized by constellations of attributes revealed through performance over ten tests; Eysenck's (1967) factor analysis of the Graves Design Judgement test uncovered a possibility of multiple factors. He writes:

> The data do suggest that the 90 items of this test measure different abilities, so that it may not be entirely justifiable to throw all the scores together into one total score (p. 74).

The development by Rouse (1964-65) of a 20-point scale was an attempt to identify and define traits usually present in art products. Factor analysis of the items seemed to reinforce Eysenck's proposition that multiple factors are to be considered in the assessment of an art work. Rouse offered six factors for consideration: Non-differentiation/Differentiation; Space; Structural/Intellectual; Kinaesthetic-spontaneity; Internal Static/Dynamic Action; Conformity/Non-conformity.

Though Hilda Lewis' (1969) investigation included a proposed revision of the Rouse scale, she seems to have used the original 20-item scale as a starting point, rather than the six-factor measure just described. Lewis was particularly concerned with the extent of the relationship which her subjects (mostly elementary school teachers) were able to establish between "originality" (item 19 on the original Rouse scale) and "artistic quality". While she was able to conclude that such differentiation was possible, she added:

> When the correlations between originality and the other 19 items for one picture were correlated with the same set of correlations for another picture, the results show that the pattern of interrelationship between originality and other items is not significantly similar for different pictures (Lewis, 1969, p. 34).

In face of evidence like this, the most sanguine testmaker might think twice before attempting to devise an evaluative instrument for "general art ability". There has in fact been a falling-off of interest in this type of instrument over the past three decades in favor of a greater degree of concentration upon measures of specific art-related factors.

The Lantz Easel Age Scale is one such measure (Lantz, 1955); its main purpose is to provide a record of growth and adjustment for kindergarten and elementary school children through an examination of their easel paintings. The success of the scale depends upon taking repeated measures on four dimensions of the child's painting:

(1) form (on a seven point scale: an increasing ability to use lines, circles, squares);
(2) detail (on a seven point scale: an increase in the amount of detail employed);
(3) meaning (on a six point scale: an increasing ability "to paint a picture which has meaning to the adult") (Lantz, 1955, p. 2); and
(4) relatedness (on a five point scale: increase in depth perception, and the ability to demonstrate knowledge of "above", "behind", "beside" and similar relationships).

Eliminated from consideration are what Lantz has termed "Q" paintings. These may be non-characteristic, painted during a fit of anger or depression, or a manifestation of some deeper, long-lasting emotional problem. Lantz recognizes that in the initial period while teacher and children are getting to know each other, "Q" paintings will be fairly common.

> The kindergarten teacher will, no doubt, look over her first pictures of the year . . . and decide that she has a room full of emotionally disturbed children; and she undoubtedly has. The transition from the security of the home to school group conformities . . . often creates tensions, anxieties, frustrations, aggressions, and withdrawals as well as happy acceptance (1955, p. 9).

She suggests that even well-adjusted children revert to "Q" paintings in new or frustrating situations; hence the necessity for a *succession* of paintings, if any estimate of growth is to be made.

Reliability coefficients for the Easel Age Scale were very high (.95 on retest and .94 on inter-judge reliability). Internal validity was established by computing intercorrelations among subscores for Form, Detail, Meaning and Relatedness. The lowest intercorrelation (.59) occurred for Detail/Relatedness, while the highest (.87) occurred for Form/Relatedness. A range of correlations resulted when scores obtained on the test were compared with scores obtained with the California Test of Mental Maturity for Intermediate Grades. Since there occurred a decrease in correlations with the CTMM from primary to elementary to intermediate grades, one may speculate that the Easel Age Scale is most efficient when it is used for the paintings of kindergarteners and children in primary grades.

Art Tests as Indices of Concept-Forming Ability

A number of researchers have sensed the possibilities of using art works as a means of determining intellectual competency. Graphic

evidence of how a subject relates one part of an object to another, or the extent to which he produces differentiation among forms, may result in an estimate of perceptual efficiency or of concept-forming ability. Aesthetic factors are normally unimportant in tests of this type. In her account of the development of the Draw-a-Man Scale, for instance, Goodenough (1926) was careful to point out that artistic "standards" were not relevant for her purposes. Basically, the test involves asking the children to draw a man, which is then pointscored on the presence of certain features or characteristics—the presence of fingers, for example, or an indication of nostrils. By substituting age norms for the total point score, a mental age is established and an I.Q. score can then be calculated.

Norms were established by consideration of chronological age and school grade. Goodenough's first intention was to find an alternative measure of intelligence, one which called for graphic rather than verbal response. "A Man" was decided upon as the preferred subject for representation, since it met the criterion of familiarity to the subjects, had little variability, and had universal appeal. Almost 4,000 subjects, of ages from four to ten years, were used in the final standardization of the test. Results led Goodenough to claim that it had predictive validity for a child's future success in school; moreover, she noted an average correlation from normative samples of .76 between Stanford Binet Mental Age and Draw-a-Man Mental Age. However, one of Goodenough's former associates subsequently pointed out the shortcomings of Goodenough's method of deriving mental age:

> It has been shown repeatedly that because mental abilities do not develop in a strictly rectilinear function this method of depicting mental level presents certain statistical problems. Unless the construction and standardization of the measure are very carefully conducted, there will be a variation in the standard deviation of scores from age to age, which will make a given I.Q. value of different significance, so far as indicating exceptionality is concerned (Harris, 1963, p. 88).

In addition to its function as an alternative measure of intelligence, the Goodenough test provided, according to its developer, an index of conceptual growth:

> . . . at any given time a child's drawing will consist of two parts—the first part embracing those characteristics which have already become an integral part of his concept of the object drawn and consequently appear invariably; the second part including the elements which are in process of becoming integrated and are therefore shown with more or less irregularity. The frequency with which any given characteristic tends to appear is a function of the extent to which it has become integrated into the developing concept, and a measure of the weight which should be given it as an index of concept development (Goodenough, 1926, p. 75).

Harris' (1963) revision of Draw-a-Man attempted an upward extension of the test into the adolescent years. (Goodenough had cast doubts upon the validity of the measure after the onset of self-consciousness, typically occurring around 11 years of age.) Harris' interest was also directed towards the development of alternative forms of the scale, such as drawing a woman and drawing oneself. His subjects were drawn from K through grade 9 classes, each sample being made up of 100 children. Among his

findings was "a surprisingly modest" correlation of .75 between Draw-a-Man and Draw-a-Woman scores, which led him to speculate that perhaps different abilities were measured by these instruments (Harris, 1963, pp. 106-107). It is difficult to see what these might be, but inconsistencies may be somehow related to a relative lack of social interest displayed by the boys (noted both by Goodenough and by Harris).

As a counterpart to the analytic method of the Goodenough-Harris measure, Frankiel (1956) developed a scale to provide for holistic assessment. She used some of those drawings which Harris had employed in standardization, and asked 12 judges to rate a selection of drawing on "ideas", "inclusion and accuracy of detail" and "proportion". Their ratings resulted in the selection of 23 drawings to form the Quality Scale. When Quality Scale scores were correlated with point scores over several age group combinations, employing as raters five judges ranging from naive to experienced, coefficients varied between .79 and .84. Harris (1963) pointed out that the Quality Scale was ". . . useful principally because the Point Scales had been previously constructed and their validity painstakingly established (p. 114)." Both "inclusion and accuracy of detail" and "proportion", it should be noted, are terms closely allied to items which a scorer is expected to rate on the Point Scale.

Art Tests as Indices of Social and Personal Adjustment

The use of graphic measures is occasionally mentioned in the literature associated with some aspects of psychiatry (Machover, 1949), sociology (Dennis, 1966), and anthropology (Havighurst, 1946) as means to reveal attitudes and personality traits which are not readily obtainable through verbal interaction. For example, an exhaustive collection of drawings based on the instruction "Draw-a-Man" has been compiled by Wayne Dennis (1966). From an extended study of this material, Dennis has formulated a hypothesis which has predominantly sociological connotations: "that children draw the men whom they admire and who are thought of favourably by their societies (p. 2)."

One of Dennis' surveys (1966) features 2,550 drawings from places as widely scattered as Brooklyn, Edinburgh, Heidelburg, and Taiwan. In contrasting a "familiarity hypothesis" (i.e. that children draw that which they are most familiar with) with a "value hypothesis" (i.e. that children draw that which they most admire), Dennis produces a wealth of material to support the latter at the expense of the former. He cites numerous instances in which familiar ethnic clothing and appearance details are ignored; workers are, in every sample, infrequently represented since, he feels, they have little status. Dennis acknowledges the difficulty of validating his hypothesis, because there are no established techniques yielding categories of values similar to those which he has developed. But inferential evidence has been forthcoming. In a more recent study (Dennis, 1968) he notes that the number of Negroes drawn by Negro children has shown a noticeable increase within the past decade as the black self-image has become more positive.

Dennis believes that the child's drawing is primarily a reflection and projection of social values; other researchers favour a more personal inter-

pretation. Typical of the "personality projection" approach is Machover's 1949 study. Her method is clinical rather than experimental. Over a period of fifteen years she built up a file of drawings of men and women, furnished by subjects undergoing analysis, and she has attempted to describe those graphic characteristics which, she feels, reveal the conflicts, impulses, and anxieties of these subjects. Machover (1949) quotes Anastasi and Foley's (1941) misgivings on the extent to which such differentiation could be made: ". . . only in the presence of extreme mental disorders and only with individuals who offer personalized, startling, or bizarre productions (p. 19)." Nevertheless, Machover feels that patterns of drawing traits can be used extensively in helping to diagnose aberrations, and claims that "Though some of the assumptions may lack experimental verification, they have proved clinically valid (p. 34)."

Machover's text describes an experiment in which an effort was made to match sets of anonymous drawings with case records. The judges were herself and one other competent clinician. A degree of matching was reported which was better than chance. But since there were no randomized drawings by "normals" included, the results have little experimental significance. Warning against the popularization of her methods, Machover (1949) pointed out that many normal children's drawings contain traits which in her case studies are classified as aberrant. Remarks which she made on the drawings of a grinning mouth ". . . interpreted as forced congeniality, an effort to win approval (p. 35)" or that an obsessive preoccupation with an area is indicated by much erasing in that area are appropriate only to clinical analysis of individuals, and cannot safely be applied to the analysis of drawings produced in the classroom.

Conclusion

On the basis of the examples offered, the construction of "art tests" seems to be predicated upon the following questions:

1. What is the extent of the subject's ability to make qualitative choices among art objects or art works of differential aesthetic merit? (the *qualitative decision-making* aspect)
2. What kinds of verbal/non-verbal responses do subjects make to selected stimuli, which might reveal their current ability to process information? (the *cognitive* aspect)
3. What kinds of verbal/non-verbal responses do subjects make to objects and situations, which might reveal their emotional, subjective feelings or their socio-cultural characters? (the *attitudinal* aspect)

In addition, tests such as that designed by Eisner (1965) to ascertain the extent of a subject's knowledge of art history, artists, art terms and processes require inclusion as a separate aspect.

4. What is the present state of the subject's knowledge regarding the identification of art objects and artists, art methods and processes, and overt forms of art activity? (the *informational* aspect)

Of these four aspects, only the last can be expected to yield relatively unambiguous and stable results. Any form of qualitative decision making requires a set of acceptable criteria for what constitutes a "better" or

"worse" art work. But Weitz (1962) has pointed out the impossibility of establishing a finite number of such criteria; it therefore becomes the obligation of the individual researcher to draw up limited criteria, to make these known to subjects prior to testing, to adhere to them strictly in scoring, and to make interpretation of the results only insofar as his self-imposed limitations permit.

Graphic tests of a "cognitive" nature must also be interpreted with caution, since there is no guarantee that the subject's drawing is an adequate reflection of his capacity to handle information. A graphic vocabulary is acquired through practice; the unpracticed individual may be judged to lack concept-forming capacity when he really only lacks graphic skill. Also, the fact that a phenomenon is perceived carries no guarantee that it will thereafter appear in graphic form, particularly in the case of small children, whose priorities for including details shift markedly from one drawing to the next. Using art tasks as projective measures in an attempt to establish a personality profile may be justified for clinical purposes. Repeated applications of tests of this type seem desirable, if evidence of aberration is required. The anthropologist's considerations must include the status accorded graphic art activity within a society, together with prevailing cultural taboos and strictures (Ballinger, 1969).

Clearly, then, the complex nature of the variables with which art measures are concerned, at other than strictly informational levels, and the difficulty of isolating these variables for experimental purposes, call for rigid controls or exhaustive descriptions of the testing situation, in order to achieve results which can be accepted and defended with confidence.

References

Anastasi, A., & Foley, J. A. A survey of the literature on artistic behavior in the abnormal. *Journal of Genetic Psychology,* 1941, *25,* 111-237.

Ballinger, T., & Sundberg, N. *Drawings by Nepalese children.* Occasional Paper No. 5, The Creative Education Foundation, Buffalo, N.Y., 1969.

Beittel, K., & Burkhart, R. Strategies of spontaneous, divergent and academic art students. *Studies in Art Education,* 1963, *5,* 20-41.

Bernheim, G. The dimensionality of differential criteria in the art product. *Studies in Art Education,* 1964, *6(1),* 31-48.

Burkhart, R. C. *Spontaneous and deliberate ways of learning in art.* Scranton, Pa.: International Textbook, 1962.

Dennis, W. *Group values through children's drawings.* New York: John Wiley, 1966.

Dennis, W. Racial change in Negro drawings. *Journal of Psychology, 1968, 69,* 129-130.

Eisner, E. W. Curriculum ideas in a time of crisis. *Art Education,* 1965, *17,* 7-12.

Eysenck, H. Factor-analytic study of the Maitland Graves Design Judgement Test. *Perceptual and motor skills,* 1967, *24(1)* 73-74.

Flick, P. Ten tests of the visual haptic aptitude. *Studies in art Education,* 1963, *4,* 24-34.

Frankiel, R. A quality scale for the Goodenough Draw-a-Man Test. Unpublished Master's thesis, University of Minnesota, 1956.

Goodenough, F. *Measurement of intelligence by drawings.* New York: Harcourt Brace, 1926.

Graves design judgement test. New York: Psychological Corporation, 1948.

Greene, E. B. *Measurement of human behavior.* New York: Odyssey, 1952.

Harris, D. *Children's drawings as measures of intellectual maturity.* New York: Harcourt Brace, 1963.

Havighurst, R. J., et al. Environment and the Draw-a-Man Test. *Journal of Abnormal Psychology,* 1946, *41,* 50-63.

Lantz, B. *Easel age scale.* Los Angeles: California Test Bureau, 1955.

Lewis, H., & Mussen, P. The development of an instrument for evaluating children's artistic creativity. *Studies in Art Education,* 1969, *10(3),* 25-48.

Lundholm. Affective tone of lines. *Psychological Review,* 1921, *28,* 43-60.

McAdory, M. *The McAdory art test.* New York: Bureau of Publications, Teachers' College, Columbia University, 1929.

Machover, K. *Personality projection in the drawing of the human figure.* Springfield, Illinois: Thomas, 1949.

Meier, N. C., & Seashore, C. *The Meier-Seashore art judgement test.* Iowa City: Bureau of Educational Research and Service, University of Iowa, 1940.

Poffenberger, & Barrows. Feeling value of lines. *Journal of Applied Psychology,* 1924, 1, 187.

Rouse, M. J. *Development and validation of descriptive scale for measurement of art products.* Cooperate Research Project No. S-007, Indiana University, 1964-65.

Weitz, M. The role of theory in aesthetics. In N. Margolis (Ed.), *Philosophy looks at the arts.* New York: Scribners, 1962, pp. 48-58.

The Alberta Journal of Educational Research *Vol. XVIII, No. 2, June, 1972*

D. M. RICHARDS

Predicting the Demand for Teachers

The recent change in the supply-demand relationship of the teaching force in Canada has led to many examinations of the situation as it obtained over the past two decades. While many studies have proceeded as if the major cause of the increased demand for teachers has been an increase in the school-aged population, this study set out to examine the relative importance of increased population, attendance rates, and structural changes within the educational system as these factors relate to teacher demand. The findings of the study indicate that while the major factor in determining the increased demand for elementary and junior high school teachers has been an increase in the population, the increased demand for high school teachers has been most closely related to increased attendance rates. The change in the structure of the educational system has been an important factor in teacher demand at all levels. (Dr. Richards is an Assistant Professor in the Department of Educational Administration at The University of Alberta.)

During the past two decades, all parts of Canada have experienced the effects of a shortage of teachers. While some parts of Canada have experienced more difficulty than others as a result of this shortage, most school authorities have had to resort to unusual measures to obtain a sufficient number of staff. Recently, this situation has changed rapidly. In Alberta, for example, the early 1960's saw school authorities actively recruiting teachers from other countries. During the 1970-71 school term, little difficulty was experienced in obtaining a sufficient number of teachers. During the 1971-72 school term, there appears to have been a surplus of trained teachers in Alberta.

Problem

Two questions have been raised in regard to the teacher supply in Alberta:

1. Could the current over-supply of teachers have been predicted?

2. What are the important factors influencing the demand for teachers in Alberta?

The above two questions are generally related to educational planning, and there is a belief that the techniques of educational planning may provide the answers to these two questions.

Social Demand Model

One of the most common forms of educational planning has been the social demand approach. Although there have been a great many modifications in the technique as it has been applied, the following constitutes a common procedure:

1. estimate the number of persons that have a "right" to education;
2. estimate the levels of education that will be demanded based on past trends;
3. estimate the kinds of specialized education that will be demanded based on past trends;
4. relate step 1 to steps 2 and 3 to obtain an estimate of the demands upon the educational system; and,
5. estimate the various resources including teaching staff, required in the educational system. Thus, in general the social demand approach assumes that the number of teachers required is essentially a function of the population.

A Recent Study

In a recent study conducted at The University of Alberta, (Richards, 1971) an attempt was made to examine the demand for teachers through the social demand approach. In this study, an estimate of the future population was made on the basis of the present population, estimates of birth rates, estimates of death rates, and estimates of migration rates. An estimate of the future school population was made on the basis of total population and estimates of attendance rates. An estimate of the future demand for education at various levels and of various kinds was based on the school population. An estimate of the future number of various kinds of teachers required was based on the demand for education. In terms of mathematical formulae, the model could be expressed as follows:

$T=f(E)$, where T was the number of a particular type of teacher required,
and
where E was the demand for education.

$E=f(S)$, where S was the number of a particular age of student

$S=f(P_2)$, where P_2 was some future population.

$P_2=f(P_1, B,D,M)$, where P_1 was the present population,
where B was the birth rate,
where D was the death rate,
and
where M was the migration rate.

While the bases of some of the calculations were in some cases quite complex, the fundamental relationships among some of the variables may

be translated into simple terms. The relationship between the number of each type of teacher required and the demand for education depended to a large degree upon the pupil-teacher ratio. The relationship between the demand for education and the number of students depended to a large degree upon the enrolments in various courses. Attendance ratios were used to reflect the relationship between the number of students and the population. The population projections were carried through using a basic cohort-survival technique with migration treated as a residual. That is, while birth rates and death rates were available, migration was estimated from the 1961 and 1966 census. Thus, the population projection depended upon variables which were largely uncontrollable to the education system while all other mathematical relationships were dependent upon variables controllable as a matter of policy of various school systems within Alberta.

To further explain the above, population is affected by births, deaths, and migration. These variables depend upon events and decisions which are uncontrollable, in the present situation, by all levels of government. However, the attendance of an individual in school can be determined largely by policies of the provincial and federal governments. Similarily, the enrolment of a student in a particular course, while it may be left to the discretion of the student, can easily be conceived of as a matter of policy of the local or provincial school authority. The demand for teachers is then a function of both controllable and uncontrollable variables.

The Projections

In the study referred to previously, several projections of the demand for teachers in Alberta were made. For each of the variables mentioned, several future values were hypothesized. These hypotheses were based on values and trends in values of the particular variables. That is, information was compiled for the period 1951 to 1967, inclusive, regarding age-specific birth rates, age- and sex-specific death rates, enrolment by age and grade, enrolments by subject, and pupil-teacher ratios. Although several different projections were made using the assumed values of the above parameters, only a few of these projections are of interest in this paper.

With the values of the variables assumed such as to produce, alternatively, the highest possible and the lowest possible demand for teachers in Alberta, a very wide range was predicted. For example the range in predictions for 1975-76 was from 16,537 to 27,163 teachers in Alberta. For 1980-81 the range in predictions was from 16,875 to 36,160. For each year of the projections, a medium value was predicted using the most reasonable values of the variables. For 1975-76 the medium value was 20,987 teachers and for 1980-81 the medium value was 23,539 teachers. It should be noted, on the basis of more recent data, the medium value of the projections would appear to be biased slightly low.

Controllable vs. Uncontrollable Variables

Since many of the past studies of the demand for teachers have been based largely on the population growth, it was of interest to examine

the effect of only the population variables on the demand for teachers. For this reason, all other variables were set so as to predict the medium values of teacher demand while a combination of high birth rates and low death rates was used alternately with a combination of low birth rates and high death rates. The range of predictions derived from these variables was from 19,527 to 21,990 teachers for 1975-76 and from 19,931 to 26,025 teachers for 1980-81.

The results of the projections mentioned thus far illustrate that even though wide ranges were characteristic of the projections, the population variables accounted for only 23 per cent of the total range of the projections for 1975-76 and 32 per cent of the total range for 1980-81. The suggestion that arises from these results is that policy and not population may be responsible for large changes that occur in the demand for teachers.

Past Demand for Teachers in Alberta

Since the projections emphasized the importance of policy variables, it was of interest to examine the change in the demand for teachers in Alberta over the period 1951-52 through 1966-67 to determine the relative effects of policy and population.

The period 1951-52 through 1966-67 was characterized by a rapid increase in the population. Increases of 92 per cent, 105 per cent, and 74 per cent occurred in the age groups 5 to 9, 10 to 14, and 15 to 19 respectively (DBS, 1953-1968). For the total of all three of these age groups the increase was 91 per cent. Of the school aged population the attendance of five year olds decreased slightly over the time period while the attendance of fourteen to nineteen year olds increased. The effect of only the change in the population has been to almost double the demand for teachers in Alberta over the period 1951-52 through 1966-67.

Actual Increases in Demand for Teachers

It was of interest, in the light of the population and attendance changes, to examine the actual change in the demand for teachers. To accomplish the examination of demand, the definition of teacher that has been used by the Alberta Department of Education was adopted. Also, the demand for teachers was examined in terms of the categories elementary school teachers, junior high school teachers, and high school teachers. In 1951-52 there were 4,097 elementary school teachers, 1,714 junior high school teachers, and 1,127 high school teachers for a total of 6,938 teachers (Alberta, Department of Education). At the same time the pupil-teacher ratios were 28.2:1 for elementary, 24.4:1 for junior high, and 19.7:1 for high school. By 1956-57 the numbers of teachers were 5,487 elementary, 2,316 junior high, and 1,470 high school teachers for a total of 9,273 teachers and pupil-teacher ratios of 27.2:1, 23.8:1 and 20.4:1. In 1961-62 the number of teachers were 7,880 elementary, 3,017 junior high, and 2,445 high school for a total of 13,342 teachers with pupil-teacher ratios of 23.4:1 for elementary, 25.2:1 for junior high, and 19.2:1 for high school. In 1966-67 there were 10,393 elementary teachers, 4,362 junior high school teachers, and 3,559 high school teachers for a total of 18,314 teachers and

pupil-teacher ratios of 20.5:1 for elementary, 21.1:1 for junior high, and 19.0:1 for high school. These data are illustrated in Table 1.

TABLE 1

PUPIL-TEACHER RATIO IN ALBERTA IN SELECTED YEARS*

Year	Level	Teachers	Pupils	Pupil-Teacher Ratio
1951-52	Elementary	4,097	115,655	28.2:1
	Jr. High	1,714	41,813	24.4:1
	High	1,127	22,223	19.7:1
1956-57	Elementary	5,487	149,111	27.2:1
	Jr. High	2,316	55,228	23.8:1
	High	1,470	30,058	20.4:1
1961-62	Elementary	7,880	184,659	23.4:1
	Jr. High	3,017	76,173	25.2:1
	High	2,445	46,870	19.2:1
1966-67	Elementary	10,393	213,058	20.5:1
	Jr. High	4,362	92,256	21.1:1
	High	3,559	67,579	19.0:1

* Source: Richards, 1971, p. 6

For the time period 1951-52 to 1966-67, the increases in the numbers of teachers required have been 154 per cent for elementary teachers, 155 per cent for junior high school teachers, 215 per cent for high school teachers, and an increase of 164 per cent in total. Obviously the requirement for teachers over the time period has increased by a factor greater than two and one half as compared to population changes of about a factor of two.

Effect of Population Changes

If the attendance rates and structure of the education system had remained as they were in 1951-52 the population changes would have increased the demand for teachers in 1966-67 to 7,847 elementary teachers, 3,513 junior high school teachers, 1,960 high school teachers, and a total of 13,320 teachers. Of the total increase in the demand for teachers between 1951-52 and 1966-67 the proportions corresponding to the increases in population were 60 per cent of the elementary teachers, 68 per cent of the junior high school teachers, 34 per cent of the high school teachers, and 56 per cent of the total. Table 2 illustrates these data.

Effect if Changes in Attendance Rates

The change in attendance rates, if structural changes had not occurred, would have resulted in the following demands for teachers in 1966-67; 7,555 elementary teachers, 3,780 junior high school teachers, 3,430 high school teachers, and a total of 14,766 teachers. These data reflect increases in demand due to attendance changes of -5 per cent of the increase in

elementary school teachers, 10 per cent of the increase in junior high school teachers, 60 per cent of the increase in high school teachers, and 13 per cent of the total increase.

TABLE 2

EFFECT OF CHANGES IN POPULATION, ATTENDANCE, AND STRUCTURE ON THE DEMAND FOR TEACHERS IN ALBERTA FROM 1951-52 TO 1966-67*

Factor	Elementary	Jr. High	High	Total
Actual 1951-52	4.097	1,714	1,127	6,938
Actual 1966-67	10.393	4,362	3,559	18,314
Increase	6,296	2,648	2,432	11,376
Population Change	7,847	3,513	1,960	13,320
Per Cent of Increase	60	68	34	56
Attendance Change	7,555	3,780	3,430	14,766
Per Cent of Increase	-5	10	60	13
Structure Change	(increase unaccounted for by changes in population and attendance)			
Per Cent of Increase	45	22	5	31

* Compiled from Table 1

The above data illustrated in Table 2, suggest that much of the increase in the demand for teachers has resulted from population and attendance changes. Further examination of the data also suggests that some of the increase in the number of teachers has been taken up with a reduction of the pupil-teacher tatio. While this has some basis in fact for the junior and senior high school, it appears to be particularly true in the case of the elementary school. Since all staff with teaching qualifications have been counted as teachers, the above may indicate structural changes in the elementary school systems. Increases in the release time for administrators or more professional staff may be among the structural changes anticipated. Also, the introduction of special classes in the elementary schools would certainly have had an impact upon the pupil-teacher ratio.

Effect of Changes in Structure

To relate the effects of structural changes to the increase in the demand for teachers, the actual demand for 1966-67 was compared to the demand that accounted for only population and attendance changes. The proportions of the increases in demand for teachers that could be attributed to structural changes were 45 per cent for elementary school teachers, 22 per cent for junior high school teachers, 5 per cent for high school teachers, and 31 per cent for the total. Obviously, structural changes in educational organizations have accounted for a significant part of

the increase in the demand for teachers especially in the case of the elementary school.

Conclusion

The fact that population changes accounted for only a small portion of the range of projections of the demand for teachers suggested a re-examination of the factors associated with the past increases in the demand for teachers. Over the period 1951-52 through 1966-67, even though population increases accounted for a major part of the increase in the demand for teachers, changes in the attendance rates and changes in the structure of educational organizations combined to account for nearly one half of the total increase in the demand for teachers. Thus, if predictions of the current demand for teachers had been based exclusively upon population changes, it is likely that the present demand would have been underestimated and the current over supply would have been over estimated. The predictions of the future demand for teachers are thus subject to large errors if based only upon population changes.

References

Dominion Bureau of Statistics. *Population.* Ottawa: Queen's Printer, 1953, 1958, 1963, 1968.

Government of Alberta, Department of Education. *Annual report.* Edmonton; Queen's Printer, 1951-1968.

Richards, D. M. Availability and requirements for teachers in Alberta: 1971-1981. Unpublished doctoral thesis, The University of Alberta, 1971.

The Alberta Journal of Educational Research *Vol. XVIII, No. 2, June, 1972*

A. G. STOREY

Self Development in Adult Male Students in Relation to Success and Non-Success

This comparative study used five groups of subjects: (i) university males (successful), (ii) university males (unsuccessful), (iii) senior matriculation male high school graduates (successful), (iv) diploma male high school graduates (marginally successful), and (v) unsuccessful males who discontinued school before high school graduation. All of the 254 subjects responded to both the "i" and "w" forms of the Q-Tags instrument. Success was found to relate positively with affect and negatively with hostility. All groups showed strong wishes for greater effectiveness with corresponding decrement wishes for social involvement. (Dr. Storey is an Associate Professor of Educational Psychology at The University of Calgary.)

The aims of high school education are generally couched in terms of personal and social development. Bruner (1966) begins his theory of instruction with a claim for such objectives; Piaget (1962) implies the same aims. The *Alberta High School Handbook* (1966) like most other such documents fails even to mention academic achievement in outlining school aims. Apparently, then, the individual attends school in order that he might increase his stature in such areas as: (1) personal development, (2) growth in family living, (3) growth towards competence in citizenship, and (4) occupational preparation. However, when the student inquires as to how well he has succeeded in school, the response is always in terms of science, mathematics, English and other percentages. Furthermore, the some 75 per cent of Canadian pupils who are required to discontinue school before high school graduation (it matters little if the request is their own or the school's) find the withdrawal necessary not because they failed to "grow and develop" but because they did not learn a sufficient number of facts in areas such as science, mathematics, or English.

The current study constitutes but another enquiry (see Storey, 1967) into some of the personal, and through them, some of the social implications attributable, at least in part, to the school's curricula. If Coleman (1960) and other personality theorists are right, the school must accept

a large measure of the responsibilities for what the individual becomes, whether it wishes to limit itself to academic pursuits or not. The hypotheses tested by the present study were that (1) the five groups of male subjects studied will exhibit no significant intergroup differences in affective, assertive, effective, hostility, reverie, or social concern scores as measured by the *Q-Tags Personality Test,* (Storey, 1969) and (2) nor will these groups produce significantly different intragroup scores on the same factors as measured by the same instrument.

Subjects and Testing Procedure

The subjects for the current study consisted of: (1) a random sample of 42 successful second year university males, (2) all of the 32 unsuccessful ex-university students currently enrolled in a petroleum and chemical technologies course at a technical institute, (3) all of the 71 senior matriculation graduates (successful high school students who did not aspire to university) enrolled in the same technical institute and course, (4) all of the 58 diploma graduates (marginally successful high school students) enrolled in this technical institute and course, and (5) all 51 male school dropouts (mean school grade 9.1) registered in a prevocational academic upgrading course at the Calgary vocational training school.

Although ability and achievement scores were not available on any of the groups tested, it was assumed that there would be little difference in the ability ratings of Groups 1, 2, and 3. Group 4, it was expected, would score somewhat lower than the first three groups in ability while Group 5 would probably score below Group 4. Groups 1 and 3 were considered to be "success" groups while Group 4 was marginally successful. Groups 2 and 5 both experienced school failure though at different levels.

All of the subjects responded to both the "i" and "w" forms of the Q-Tags instrument. Form "i" of the test was administered first with form "w" following from three to seven days later. This time lapse between the "i" and "w" forms of the test was judged optimum in compromising between the subject's memory for card placement in form "i" and change in the phenomena measured before the administration of form "w". Table 1 summarizes the data obtained through the administration of these tests.

Treatment of Data

An analysis of variance treatment of the data given in Table 1 indicated that there were significant differences ($p < .01$) among the intergroup mean scores on the "i" form of the sort. The same technique revealed intragroup differences in "w" scores also. The *t*'s or critical ratios of these findings were determined in order to locate specific areas of difference. Table 2 gives the *t*'s of those differences found to be statistically significant. (A similar table for the "w" sort is not appropriate since the groups scored differently on the "i" sort and there was no common starting point from which to "wish").

It is to be noted that although some of the absolute differences available from Table 1 are very similar in magnitude, the "t's" between them are quite different owing to the influence of variances and sample sizes.

TABLE 1

MEAN Q-TAGS SCORES OBTAINED ON EACH GROUP

Test form	Factor	University		University dropouts		Matriculants		Diplomats		Cdn. Voc. Training	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
i	affective	47.5	9.1	43.3	7.7	44.1	7.8	43.9	7.4	46.3	9.5
	assertive	59.0	6.7	61.3	9.3	60.8	8.0	60.6	7.4	59.4	7.4
	effective	54.0	10.8	58.3	9.0	56.3	8.0	57.4	8.1	53.9	10.0
	hostility	43.6	5.8	44.8	9.0	44.7	8.9	43.7	8.8	48.4	9.6
	reverie	52.4	7.7	52.3	8.7	52.6	8.2	55.3	7.9	52.0	9.0
	social	66.5	7.6	63.7	8.5	63.7	10.0	63.9	8.5	64.1	8.7
w	affective	52.4	7.6	45.5	8.7	46.9	7.7	46.0	7.4	49.2	6.6
	assertive	58.2	7.9	62.1	9.4	60.7	8.6	62.3	9.6	61.8	6.8
	effective	64.3	6.2	66.4	7.0	63.8	7.7	65.5	9.1	62.8	7.3
	hostility	45.3	6.5	46.8	8.9	46.9	8.4	45.3	8.6	48.0	8.1
	reverie	54.8	8.2	50.5	8.5	52.8	8.9	53.7	8.6	51.6	7.5
	social	49.5	7.0	53.6	6.0	52.1	8.9	51.3	9.4	50.5	8.5
"i" versus "w" coeffecients of correlation		.38		.25		.21		.18		.14	
	N	42		32		71		58		51	
	Mean Age	20.1		22.1		20.4		20.11		20.1	

For example, the absolute difference between UDO and CVT groups on the "i" form of the test is 4.4, which proves to be statistically significant. The similar difference of 4.3 between UDO and successful university students is far from significant owing to the smaller N and larger variances in the case of the successful university group on the one hand, and the CVT group on the other.

The t ratios were also determined for the within groups "i" versus "w" mean scores. Table 3 presents the t's that were found to be significantly different from zero.

Discussion and Conclusions

An examination of the data given in Table 2 indicates that the successful university men scored significantly higher on the affective scale than did university dropouts, senior matriculants and grade XII diploma graduates. This finding would suggest that there is a positive relationship between academic success and affective involvement.

Although it was beyond the scope of the present study to determine which of these phenomena is cause and which effect, former studies utilizing the Q-Tags Test seem to suggest that academic achievement results from affective involvement.

TABLE 2

SIGNIFICANTLY DIFFERENT INTERGROUP "i" SCORES REPORTED AS *ts*.

Factor	Group Comparison									
	University versus University dropouts	University versus Matriculants	University versus Diplomats	University versus Cdn. Voc. Training	University dropouts versus Matriculants	University dropouts versus Diplomats	University dropouts versus Cdn. Voc. Training	Matriculants versus Diplomats	Matriculants versus Cdn. Voc. Training	Diplomats versus Cdn. Voc. Training
affective	†2.15*	†2.03*	†2.11*	—	—	—	—	—	—	—
assertive	—	—	—	—	—	—	—	—	—	—
effective	—	—	—	—	—	—	†2.08*	—	—	†1.99*
hostility	—	—	—	†2.97**	—	—	—	—	†2.16*	†2.65**
reverie	—	—	—	—	—	—	—	—	—	†2.02*
social	—	—	—	—	—	—	—	—	—	—

Note: † indicates the group scoring significantly higher than other groups.
* significant at or above .05.
** significant at or above .01.

Both university dropouts and diploma graduates, the two groups with limited success, consider themselves to be more effective than the prevocational students who discontinued school before graduation, i.e. before any appreciable degree of success was achieved.

The prevocational men were found to be more hostile than successful university students, senior matriculants, or diploma graduates, a finding which suggests a positive relationship between lack of success and hostility for students at these levels.

Diploma graduates scored higher on the reverie scale than did any of the other groups, suggesting that "daydreaming" may have been a factor in limiting their success.

The data summarized in Table 3 reveal that both successful university and senior matriculation graduates wish for greater affective involvement with their environment than they now have. And, this in spite of the fact that the university group describes itself as more affectively involved than every other group except the prevocational one. Academic success, where these subjects are concerned, then, seems to bear a positive relationship to a wish for affective involvement.

All of the groups wish to be more effective, a finding consistent with the fact that they are all now continuing in school. A wish for greater effectiveness is, however, not a characteristic of all groups. A sample of jail inmates studied with the Q-Tags instrument showed the opposite to be true (Storey and Sainty, 1967). All groups taking part in the present study also expressed a differential wish in favor of decreased social in-

volvement, that is, each group described itself as being more socially involved than it wished to be. Q-Tags norm indicate that this is a characteristic of most male student groups. Female graduates, prisoners and other non-school groups differential wishes in favor of sociability as do successful Junior High School students (Storey and Clark, 1968).

TABLE 3

SIGNIFICANTLY DIFFERENT MEAN "i" VERSUS MEAN "w" SCORES REPORTED AS *t*s.

Factor	University	University dropouts	Matriculants	Diplomats	Can. Voc. Training
affective	2.68**w	——	2.16*w	——	——
assertive	——	——	——	——	——
effective	5.36**w	4.02**w	5.69**w	5.06**w	5.13**w
hostility	——	——	——	——	——
reverie	——	——	——	——	——
social	10.66**i	5.49**i	7.34**i	7.45**i	7.98**i

* significant at or above .05;
i difference favors i means;
** significant at or above .01;
w difference favors w mean

In conclusion, then, the current study indicates that there may be measurable educational outcomes apart from academic achievement. It would suggest that affective involvement may be positively related to academic success at the adult level while hostility may be a by-product of non-success. It suggests further that strong wishes for effectiveness with corresponding wishes for a decrement in social involvement may be characteristic of adult male students regardless of their academic success or non-success. It seems that students exhibit personality characteristics and wish patterns peculiar to themselves. Further study may reveal that students at given ages and educational levels have personality characteristics and desires that differentiate them from non-students and from students at other ages and levels. It would seem also that an understanding of the possible outcomes of education in terms of such personality factors as those investigated here can be obtained through serious attempts to measure such outcomes.

References

Bruner, J. S. *Toward a theory of instruction.* Cambridge, Mass.: Bellknap Press, Harvard University, 1966.

Coleman, J. C. *Personality diagnosis and effective behavior.* Chicago: Scott Foresman, 1960.

Piaget, J. *Plays, dreams and limitations in childhood.* New York: Norton, 1962.

Province of Alberta. *Senior high school handbook.* Edmonton: Department of Education, 1966.

Storey, A. G. School acceleration and deceleration as a function of self concept. *The Alberta Journal of Educational Research,* 1967, *13.*

Storey, A. G., & Sainty, J. Personality characteristics of prisoners as compared to non-prisoners. *Canadian Journal of Corrections,* 1967, *9(4),*

Storey, A. G., & Clark, R. The self image and wish pattern of underachievers. *McGill Journal of Education,* 1968, 3(1),

Storey, A. G. *The Q-Tags test of personality.* Montreal: Institute of Psychological Research, 1969.

CORRECTION

Our readers are asked to note the following error on page 37 of the March, 1972 issue of *AJER*:

The definition of Z_i should be $Z_i = \dfrac{X_i - U_i}{\sigma_i}$